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CONTENTS

War Time Control of Industry.—Fletcher 1237
Engineering Experience—Its Value to the Captain.—Foote . 1243
Why Don't They Stay In?—Kessing. 1255
Protection Against Underwater Attack.—Schumacher. . . 1261
The Last Cruise of the "UB-88."—Nielson. 1275
Building a War Ship in the Southern Confederacy.—Parks 1299
Common Sense Training With the Service Pistol.—Baum. . 1309
The Off-Shore Gull.—Underwood. 1317
Discussion 1323
Professional Notes 1339
Notes on International Affairs 1387
Review of Books 1391
Secretary's Notes 1393

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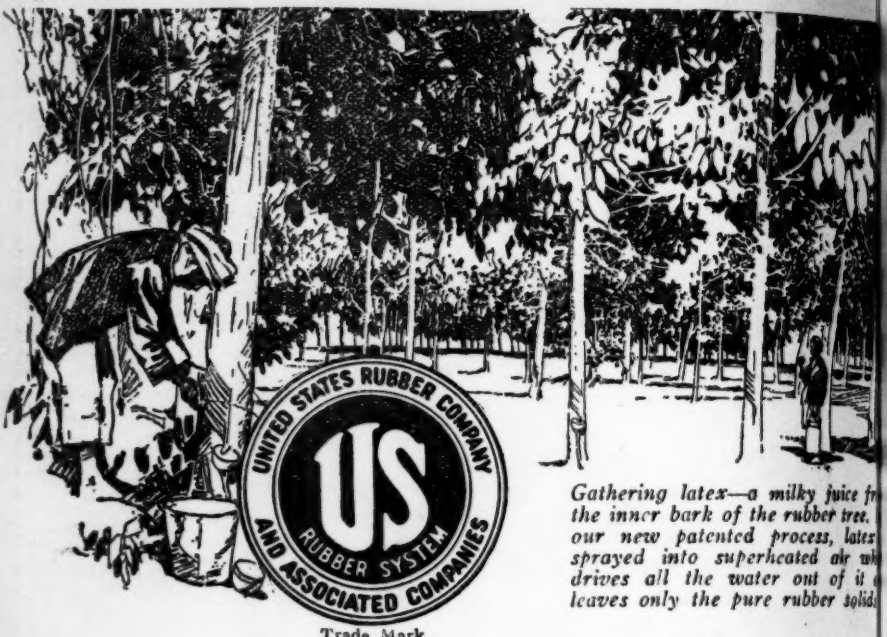

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UNITED STATES
NAVAL INSTITUTE
PROCEEDINGS

VOL. NO. 49, NO. 8 AUGUST, 1923 WHOLE NO. 246

WAR TIME CONTROL OF INDUSTRY[1]

BY REAR ADMIRAL F. F. FLETCHER, U. S. NAVY, RETIRED

THE armament of a nation is measured by the size of its naval and military forces. The real and potential armament lies in its industrial resources. It lies in the possession of raw materials and manufactories and men and credit with the power to mobilize and control them. These are the compelling factors in the outcome of a war after the first clash of the existing armaments fails to reach a decision. They constitute the second and the third army and the reserve and are the tangible power of a nation's resistance. The intangible power lies in the will and morale of the people. Thus in any protracted struggle of an intensive war the ability to mobilize and control the industrial output of a nation becomes as important as the ability to mobilize and control the armed forces in the field.

THE DEMANDS OF WAR

The activities of war center around the fighting man and his weapons and his needs. He must be supplied with all the mech-

[1] Prepared originally for the "Military Engineer," and made available for the Institute by courtesy of the author.

EDITOR'S NOTE: This photograph, as well as that on page 1319 was furnished by Commander Logan Cresap, U. S. N. (Retired), from the collection of his father, the late Lieutenant Commander James C. Cresap, U. S. N., class of 1871.

The old fellow above has been identified by Captain J. R. Y. Blakeley and Commander Cresap as Gilbert H. Purdy, Captain of the Hold. His mate on page 1319 is John King, Quarter Gunner.

Both served aboard the U. S. S. *Mohican* in the Pacific Station circa 1885-88 when these photographs were taken.

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anisms that come into use for war, and with his food and clothing and shelter and transportation. These requirements come in such variety as to cover practically the whole field of a nation's industries and they must be supplied from the excess of output over and above the needs of the civil population. In this country the peace time requirements of the armed forces and even the requirements of the minor wars through which we have passed have been obtained from our surplus capacity for production in the open market without any serious dislocation of industrial life. The supply has generally been equal to the demand and could be obtained by the usual methods of purchase having no other regulating influence than that which lies in the law of supply and demand. The magnitude of a war in which this method of obtaining war supplies can be maintained may be measured by the fact that, when our factories are running at eighty per cent capacity, not only the needs but the wants of the people are well supplied and the wealth of the nation increases. It may also be seen in the fact that before this country engaged in the World War it had produced for the Allies three billion dollars worth of war supplies while its industrial life continued to function without disturbance. As our whole industrial system is based upon competitive methods which maintain a high spirit of enterprise and initiative of the individual so essential to the morale of a people and the life of the nation, it is not desirable to disturb this condition except under grave necessity.

Errors Made in World War

But when we entered the World War we were confronted with abnormal conditions—abnormal even for war. The demands upon our manufacturing facilities were more than the most liberal estimate of requirements and far beyond the total productive capacity of the country. While it was thought that seventeen per cent of our great steel output would be required for war purposes the actual demands amounted to more than one hundred per cent. We are all familiar with the confusion that followed. The government supply agents overwhelmed the market with orders. Department was bidding against department and the government was bidding against itself. Prices uncontrolled were mounting skyward and abuses that creep in through war were

accumulating. The regulating influence governing the law of supply and demand ceased to operate. Some factories were loaded with orders beyond their capacity to produce while others were not being utilized. Military supplies urgently needed at the front had to wait for contract delivery of supplies not needed for months to come. Wharves and warehouses were overloaded and traffic became congested and restricted. The civil population was being supplied with many wants far beyond its needs, thus absorbing material and labor and capital needed in the prosecution of the war. Labor began to move, disturbed by the inequality of wages, and the high turnover was detrimental to efficiency.

In short, the machinery of the government, well adapted for conducting the affairs of a great nation in time of peace, was not equipped with any agency to obtain the supplies necessary to conduct a great war. As a manufacturing plant requires a manager to conduct its affairs and determine the kind and quantity and quality of its output and plan for its systematic distribution and delivery, so it seemed that the manufacturing plants of the country as a whole needed a manager similarly to control and direct their output.

The War Industries Board

In this emergency, the government called upon industry itself to come to its aid and industrial agencies were created to deal with the war-time problems of finance and transportation, food and fuel, and the supply of munitions. From that agency which dealt more directly with the supply of munitions was gradually evolved the War Industries Board. Its organization was composed of exports drawn from every branch of industry and from every part of the country. These men were confronted with a new problem and a difficult one. Commencing their task without any skeleton organization upon which to build, without precedent to guide them, and with but little authority of law to support them, it required a year of anxious effort, of alterations and changes and trials and errors, to complete an effective organization. It was their final organization that was able to direct and control the industrial output of the nation as effectively as a manager controls the output of a single plant.

The experience through which we passed in the World War, groping in the dark for nearly a year trying to devise means for

increasing the output of war material have been briefly referred to in order that we may now look back upon the confusion that reigned and select those salient features which lead to success and from which we may benefit in the future.

The Power of Priority

The way in which the industries of the nation were finally mobilized and their maximum efforts directed toward the production of munitions without unduly depriving the civil population of its needs was one of the greatest achievements of the war. The marvel of it was not in the achievement but in the simple means by which it was brought about and made effective. This was the power to determine the priority of production and delivery. The use of this power was a discovery and its far reaching effect a revelation. In the magic word priority lay concealed the lever which could control the whole industrial mechanism of the nation through all its ramifications.

It can be seen that the authority which determines the delivery of raw materials to any manufacturing plant may thereby determine what products it can manufacture, the quality and quantity of its products, the time of delivery and the number of its employees, and may influence the prices charged and the wages paid, all being conditioned upon the delivery of raw materials without which the factory cannot operate. This same power of allocating raw materials may restrict the output of any plant or convert its facilities to war production. It may prevent the construction of manufacturing plants in districts already congested with work but permit their construction in districts where fuel and power and labor are available but not being utilized. It may prevent all new construction of buildings and roads and bridges or any enterprise into which materials enter that are more urgently needed for war. It may restrict the number of styles and types of manufactured goods and change the materials of which they are made. It may eliminate the profiteer and to a large extent control and stabilize prices. Through priority of delivery and transportation the munitions of war may be delivered only when and where they are required by the military program and thus avoid the congestion of traffic. Supplementing the power of priority there was always available the power to commandeer and to fix prices, if necessary.

It is to be understood that all these possibilities of an industrial control were not realized in the World War for the reason that experience was at first wanting, and quite a time elapsed before it came into effective operation, but before the end of the war it became quite evident that through industrial control the efforts of the civil population can be directed toward winning a war as effectively as are the armed forces in the field.

The organization and the detail methods of administration of the War Industries Board are given in the final report of Mr. B. M. Baruch, the Chairman of the Board, and also in his lecture before the class of the Army War College. They are also graphically described in Mr. Benedict Crowell's book under the title of *The Giant Hand*. These records are of value for future reference.

Control by Industrial Experts

It will be observed that the character of the administration of industries was quite distinct from that of executive departments operating under specific laws which are subject to technical interpretations and judicial appeal. The control was exercised by industrial experts acting under the general powers conferred upon the President. They had knowledge of industrial conditions, of the traditions and customs and methods of procedure in the transaction of business, and with an appreciative knowledge of the views and temper of the people with whom they had to deal, were enabled to make the innumerable compromises and adjustments of conflicting rights and interests which were necessary to maintain the integrity of the business structure and in a way to cause the minimum disturbance. Their experience and knowledge of industrial conditions enabled them carefully to gauge and protect the needs of the civil population and to gain the co-operation and support of industry thereby maintaining the morale of industry and through it the morale of the people. This is of vital importance in any form of industrial control and of which we cannot always be assured under military methods of procedure.

Industrial and Military Control

Thus the dividing line between industrial control to produce war supplies and military control for obtaining supplies becomes well defined.

The industrial agency will administer all matters pertaining to the industrial output of the nation including munitions, food, fuel, power and transportation, which are necessary to supply the needs of the civil population and the military forces. The military forces will lay down their program of requirements as far as can be foreseen, determine the priorities of all their requirements and the times and places of delivery of finished products, make their own specifications and contracts and inspections and purchase through a single government purchasing agent or through the departmental agents under co-ordinating control. In all of this work there will be available the advice and co-operation of the industrial agency. To put this into effective operation from the commencement of war much peace-time preparation of plans and data will be required such as is now being done by the War Department.

Equality of Service

We have seen in past wars how some are drafted for military service but none for industrial service, and how the burdens of war fall heavily on some and lightly on many; while others are enriched, and all have felt the injustice in this inequality of fortune and misfortune that comes to the individual through war when sacrifice is due from all. We had come to regard these evils as inherent in the conditions of war but we can now see that they are not so of necessity. Through obligations placed upon the individual and through the control of industries all the people of the nation may be regarded as drafted into service for war. All can be made to bear their fair share of the burdens of the war in which there will be no profiteer and from which no one will emerge by reason of war, with profit to himself greater than that which comes to his brother who risks his life in battle.

ENGINEERING EXPERIENCE—ITS VALUE TO THE CAPTAIN

MOTTO: *"Seek a Certain End"*

BY COMMANDER P. W. FOOTE, U. S. NAVY

IN HIS excellent article, "The Part of Engineering in Command," in the February number of the NAVAL INSTITUTE, Rear Admiral J. K. Robison deals with one of the most important matters which affect our officer personnel today. He has set forth the wide and inviting field which engineering duty offers to an officer for rendering valuable service to the Navy and to the Nation, and he points out the need for more officers to perform this duty. To my mind, however, and I speak from some experience, a point of view which is even more important, is to emphasize what engineering duty and experience will do to an officer to enable him to become the "trained, capable captain," whom Admiral Wilson has so aptly described, an end that should be our highest ambition (the aspirations for flag command will be fulfilled if the captain's "job" is well done).

It is also important to point out what engineering will do TO an officer rather than what an officer will do TO engineering, because if the officers are convinced that this duty will be of real and lasting value to them, they will seek this duty just as they now seek gunnery duty. Then our objective would be gained; the MISSION of this problem would be accomplished, and there would be an adequate number of officers who would seek the assignment to engineering duty. This will be particularly so, if the officers are convinced that their professional fitness will be improved in a way that counts in extending their reputation and improving their chances of promotion. This attitude will be further favored if engineering performances, inspections, tests, etc., can be so vitalized that the natural taste for the exciting and somewhat spectacular features of the profession may be gratified, as it is in the gun shooting "game," and the "Rules for Engineering Performances" should be modified with this idea in mind—

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a board of umpires could inspect or "rehearse" the engineering department preliminary to speed trials in a manner similar to the board which inspects the gunnery department preliminary to target practice.

My idea of this "Mission" may be a little different from that of Admiral Robison, but I would write it as follows: "To induce all officers to seek engineering duty so that they may be better captains."

Being a correspondence school student of the War College, the "Estimate of the Situation" is just now a live subject with me, and it occurs to me that this engineering officer "Situation" might be "Estimated" as follows (with due apologies to the more skilful estimators), and in keeping with the "Mission" above mentioned.

General Considerations

The general professional interest in engineering duty is not as great as it should be. Officers are more attracted to gunnery duties than to those of engineering. This results in a lack of sufficient officers to perform the engineering duties and also in having captains in command of ships without having had much, if any, experience in operating and maintaining the motive power of the ship, which is of equal importance to the gun power of the ship.

All officers could be ordered to perform engineering duty at one time or another, but demand for officers is so great for the various other duties in the Navy that, there being no definite policy to this end, no such practice has been established. This is influenced by the natural dislike for duty in the engine room which some officers possess.

"Enemy" Forces

Their Strength, Disposition and Probable Intentions

"Enemy" Forces	Own Forces
(a) Minor prominence to engineering accomplishments compared to those of gunnery.	(a) Record of accomplishment by line officers in engineering which have improved the power of our fighting ships, such as their part in adopting electrical propulsion for battleships.

(b) Corps advocates.

(c) "Specialists."

(d) Lack of contests which have a competitive "show down" on the spot, such as target practice.

(e) Natural dislike by certain officers for duty in the engine room, where it is sometimes uncomfortable.

(f) No romance in a steam pump.

(g) Day in and day out "plugging" to keep the wheels turning, with "form H" at the end of the month, something like a "class yell" of a correspondence school (postage stamp in upper left hand corner of envelope).

(b) All those who believe that a captain can better command his ship both in peace and in war if he has had experience in all parts of the ship.

(c) All those who disagree with "Enemy Forces" (b), (c), (e) and (f).

The "enemy's" principal force is, after all, a mental attitude wherein the majority of the officers place the duties with the guns, the work of navigation, ship handling, and all the "military" part of the ship's work ahead of the engineering work, or, at least, they LIKE the "military" duties better.

This attitude is enhanced by enemy forces "(a)," "(d)," "(e)," "(f)" and "(g)."

There are a number of officers "(b)" and "(c)," who believe that our highest efficiency would be maintained if we returned to the engineers' corps, claiming that engineering has now become so complicated that only a "specialist" can properly operate the machinery involved.

The fallacy in this is that there is a great difference in the skill necessary to operate a machine and that required to build it. For the latter, "specialists" are required, but their number is small as far as officers are concerned, as the designing engineers of private manufacturers will fill the greater part of this requirement. For operation, experience has proven that the line naval

officer of today can operate successfully any form of fighting machine that can be built. Experience has also demonstrated that greater progress has been made since the amalgamation of the engineer corps with the line than before.

It is not too much to say that the electrical propulsion of battleships, second only in importance to the transition from sail to steam in our Navy, has been a direct result of the amalgamation of engineer and line duties with the general dissemination of engineering knowledge which resulted. It is also probable that the lack of this personnel system in the British Navy is one principal reason why this method of propulsion has not been adopted by them.

Probable Intention

(a) Allow the present situation to continue

Under this plan, those officers who really have a fondness for engineering duty can get it; those who do not like it, may "take a chance" on getting along without doing it, and the Bureau of Navigation will ORDER only the number actually required to perform the duty. This will not result in all captains having had engineering duty.

(b) Establish another Engineer Corps

This would surely defeat our "Mission" and on the whole result in decrease in engineering efficiency as well as in fighting efficiency.

It is not likely to occur.

Own Forces

Their Strength, Disposition, and the Courses open to us

The strength of our mental attitude is inferior to that of the "Enemy." We should adopt measures that would put the routine work of the engineers in a battleship in the public eye. "Form H" is of great value, but the results are not known till the end of the month, and then this is only a table of standing pasted on the bulletin board.

It is realized that it is not practicable to accomplish the same dramatic effects in engineering results as in those of gunnery. Much improvement could be made, however. One thing would

be to have competitive inspections for cleanliness and condition of upkeep once every three months, this competition being first held by the division commander between ships of his division and the winning ships of the divisions would be inspected by the squadron commander, the winners in the squadrons being inspected by the commander-in-chief, for the fleet championship.

The attitude of a large number of the junior officers could be greatly changed by lectures and discussion of this subject, giving engineering duty the prominence it deserves.

Courses of Action Open to Us

(a) Allow the present situation to continue—result—mission not accomplished.

(b) Induce the Navy Department to announce a definite policy that after an appropriate date, all officers will be required to perform a certain minimum amount of engineering duty AFLOAT preliminary to promotion to grade of captain.

Education of the Officers

This whole question has a direct bearing upon the education of our officers. By this I mean, training and experience; "education" in its broader sense, not that gained at the Naval Academy —we GO TO SCHOOL there.

During the last five years, and particularly during the war, we have had greater demands for officers than could be filled with those of proper rank and experience. This resulted in the assignment of officers with inadequate rank and experience to certain duties, as, for instance, the assignment of lieutenants and sometimes lieutenants, junior grade, to command destroyers. This was, in some ways, good experience for these young officers, but they lost a good deal too, in that they were doing this command duty at the time when they should have been employed in certain subordinate duties where they would have been studying the details of their professional work. About two or three years ago, I heard a member of the Naval Examining Board say that the examination papers of the junior officers, lieutenants and below, showed a marked lack of knowledge of the technical details of their profession, that they were good at telling what the captain would tell others to do, but they were short on describing

how certain things should be done, and that it seemed that we had too many "captains" in the lieutenant's grade.

For destroyers, the best policy, from the point of view of the interest of the officer, as well as of the service, dictates that no officer should be assigned to them with less work and experience than that of a lieutenant (j. g.), and no officer with less rank than a lieutenant commander should be assigned to command of one. For battleships no officer with less rank and experience than a lieutenant (j. g.) should be in command of a turret, and he should have had four or five years experience as a commissioned officer. An officer in command of a fort on shore of the size of a turret with three 14-inch guns would probably be a major in the Army.

The time seems to have arrived when we can give more attention to the need for better training of the ensigns. They can be assigned to duties where their training is the paramount thing, rather than their responsibility for operating or maintenance results. That is, they can all be assigned to engineering duty in battleships for one year!

The present indications are that promotion is soon to be much slower than it has been for the past few years and there will be more time and necessity for the performance of duties involving technical details than has been the case for some time.

The desire to attain higher and more responsible duty at a young and tender age is very commendable, and youth and energy are much to be desired in positions of responsibility, but this can lead to undesirable extremes. Our old friend "Experience" is still a big factor in the "good judgment" which makes for success.

We read of the necessity to concentrate on improving the "quality" of the material of our Navy, now that the "quantity" has been reduced by international agreement. It seems logical that the same principle of improvement should apply to the personnel.

It has been said that our profession is too extensive in character for any one man to master it, and "specialism" is proposed. The answer is, that this is not the case as far as the principal features, engineering duties and gunnery duties, are concerned, but the field is so large that certain feasible and many methods of training must be carried out continually and consistently.

Decision

(1) That every officer should be assigned duty in the engineering department of a battleship within six months after graduation from the Naval Academy and should be RETAINED in that duty for ONE year. (This would not prevent these officers from having a gunnery battle station.)

(2) That every officer should be assigned to duty as the engineer officer or an assistant engineer officer of a battleship or cruiser for a period of two years before he is promoted to captain and in ample time for him to perform this duty before his "number" for promotion is "made" on the navy list.

If this policy were adopted there would be no longer any lack of "Engineering in Command" or in the captain.

Results of Engineering Experience

In October, 1909, I had the good fortune to be assigned to duty as the Senior Engineer Officer of the *Louisiana,* after having just completed two years' duty at the gun factory. After completing the cruise in the *Louisiana,* I was assigned to duty as inspector of engineering material at the General Electric Company. From practical experience in the shops, and from a theoretical correspondence school course, I increased my knowledge of electrical engineering and had some part in the discussion of the plan to apply electrical propulsion to battleships.

From this duty I went to gunnery officer of the *Nevada,* after which I have moved on to various executive and command duties.

Speaking from this experience, I can strongly testify to the great value that my engineering experience has been to me in exercising command, both in dealing with the personnel as well as in taking action in regard to upkeep and repair of material, and also in actions affecting the movements and operation of the ship.

A recent experience in the *Patoka* will illustrate. We arrived at Gibraltar and found that the harbor inside the breakwater was filled with British ships and that the boarding officer did not think there would be a place for us inside. Due to this and to the necessity for beginning work on a crank bearing of the main engine without delay, I decided to begin work on the engine shortly after anchoring outside the breakwater and before calling

on the British officers, and gave the engineer officer authority to disable the main engine. I did not like to do this as there is always danger of a gale from the southwest which might cause the ship to drag her anchor, although no one could say that he had ever seen a ship drag her anchors there.

When I called on the British commandant at the dockyard, he very kindly offered to moor the ship at a buoy inside the harbor if I could get underway before dark. I gladly accepted this offer and said I would have the ship ready to move by 4:00 or 4:30 P. M. When I returned on board, however, the engineer officer said the engine could not be properly assembled to get underway before dark. I did not accept this and told him it must be assembled by 4:30 P. M., and implied if he could not do this, I could. He was really a very capable officer, but he simply feared that he could not meet this demand, then also, there was the unpleasant job of reassembling the engine, getting underway, and then pulling the engine down again. He went at the job cheerfully and efficiently and at 4:50 P. M., we were ready to move and we went inside the harbor, where we were protected from the gales and where the work was readily done. The point is, that I was able to decide whether or not I could reasonably expect the order to reassemble the engine to be carried out as desired; from my engineering experience I knew it could be done.

Some one may say that any captain could order that done whether he had engineering experience or not. Quite true, but suppose the order could *not* have been executed with safety and the captain had insisted upon its execution over the protests of the engineer officer and damage had resulted; then the captain's blind use of his authority would not have worked so well.

In the *War College Book* (Pye), I find that Clausewitz, Frederick the Great, Furse and Napoleon, all agree that "Knowledge is Golden," or words to that effect, and experience is the best kind of knowledge.

It is a pleasure to have some definite knowledge of the machinery when inspecting the engine room, and to make suggestions for improvements when things are wrong. If the engineer officer can tell his troubles to a captain who understands, there is much happiness in the heart of that engineer. If the captain commends the work of the boilermaker and of the turret captain with equal

understanding, the morale of the crew is improved. In other words, the captain should not be an "Alice in Wonderland" in any part of his ship.

It is not proposed that the captain should be able to fit a brass or run a lathe better than the machinist's mate can do, but he should know what to expect from a good mechanic, and this he can know through a moderate amount of practical experience when a junior officer.

As Admiral Wilson has remarked, a ship's company is a team and the captain is the leader of the team who inspires every one to do his part efficiently and cheerfully, and it is evident that this can best be done if he has some personal knowledge of the difficulties each member of the team encounters.

A battleship is a great fighting machine composed of two principal parts, her guns and her engines (and, of course, her armor), and the captain fights with both and he who knows them both is more likely to win the battle. Neither part is more important than the other. Rojestvensky's engineers could move the Russian fleet from the Baltic to the Sea of Japan, but his gunners could not hit when they got there. The *Oregon* could "move" and hit too!

It is true that in the *Oregon* there were two distinct classes of officers, the line officers and the engineer officers, and they wrote a brilliant page in their country's history. This does not prove, however, that the system then in vogue should be followed for all time. Such a tradition or belief would be a bar to progress.

Traditions which are of the spirit and which inspire heroic and courageous action are fundamental and should live forever. Tradition as to material things are apt to be a fetter to progress. Some people are today "ploughing the ground with a forked stick" because their forefathers followed this method.

The work of the officers of the former engineer corps must not be forgotten. Their accomplishments, both individually and collectively, and both before and after the amalgamation law, have formed a splendid record. Many of our most successful line officers today were members of the engineer corps, and many of the engineering records of the past twenty years have been made by line officers. This illustrates the versatility of the American

naval officer. It is an asset to be proud of and to be continuously developed. One of the things which excited the wonder and admiration of the British fleet, when our battleship squadron joined it, was the report that in one of our battleships, on the way across the Atlantic, the navigator and the engineer officer changed duties. The British, with their system, could not understand it.

Who can foresee what the next great step forward will be if "all hands" are devoted to the common thought that a ship is a fighting machine from the bridge to the engine room. We thought that the *Oregon* and her sister ships at Santiago had made a great record for Yankee marksmanship. But Admiral Scott of the British Navy sprang his idea about shooting guns on the world, and when we adopted these ideas under the leadership of Admiral Sims, our records in gunnery soon made those of Santiago look small in contrast.

We must avoid being "one-sided." An engineer officer in the Navy should not consider that engineering is in itself a definite end, but that he is to use the engines as a weapon for fighting.

Admiral Scott speaks amusingly of the day when "housemaiding" in the ship was the chief employment. There is a lesson in this, however; the chief reason for the existence of the ship had been partly overlooked.

Things which make for progress are frequently simple, once they are thought of. Admiral Scott thought of the "dotter" and the methods followed for some two or three hundred years for shooting guns on board ship were revolutionized.

Last year we were short on fuel allowances. We found a way to maintain six destroyers on the port fuel allowance for one, and millions of gallons of oil were saved and target practice and tactics were carried out. We were fighting with oil! If we "THINK" more about engineering in the Navy, we will fight better.

There is no "mystery" in engineering. It is simply a case of "off coats and at it." Even an electrical wiring diagram will fall to pieces if one will take a pencil and start tracing it. But it looks "bad" at the start.

Needless to say, these remarks are principally addressed to the younger officers (the junior commanders and below), who are

mapping out the courses which will lead to their best professional fitness. The record of accomplishment of our captains both in the past and at present is too high for any one to feel that any attempt has been made to cast any improper reflections on any one. I know I have spoken of my own experiences at the risk of being criticized for trying to "blow my own horn." I have taken this risk, however, in order that I might illustrate my conscientious belief as to the path which will lead to improvement in our fighting efficiency.

This is a problem for line officers—those principally charged with fighting the ship in battle, not an engineering problem. Shall we tacitly or actually acknowledge our failure to solve it? I do not think so.

Admiral Robison is the Engineer-in-Chief of the Navy, but he is also a line officer. From his high position he has seen the need which exists; he has sounded the call.

Let us answer with "Three cheers," and the day will soon arrive when every line officer in the Navy is equally at home in the engine room and on the bridge.

"Seek a certain end."

WHY DON'T THEY STAY IN?

By Lieutenant O. O. Kessing, U. S. Navy

THE mission of the recruiting service is to secure the largest possible number of mentally, morally and physically qualified men for the Navy.

Modern recruiting is a sales proposition. The recruiting officer is a sales manager, and he has a certain number of salesmen with whom to cover his territory. The sales manager is allowed a wide latitude in his methods and he is given all possible support by the Recruiting Bureau, under the existing laws and regulations. In Indiana, for instance, the ninety-two counties are divided into ten territories: there is at least one man assigned to each territory and his route takes him at regular intervals into each county seat and into the principal towns in his territory. The main office circularizes the rural districts, referring applicants to the nearest salesman. The salesman arranges for his own publicity and keeps in touch with the main station by daily reports; he has his territory to work, he can arrange his own schedule to suit conditions and he is absolutely responsible for results in his territory. In the more rural districts, salesmen follow the same route a week apart. This is perhaps not an ideal method but it is the most successful one yet tried here.

The salesman lines up an applicant; with his whole personality and with all his naval experience to back him, he paints in glowing colors all the many advantages of the Navy; he dwells at length upon the advantages of a cruise in the Navy; he tells the prospect that he will have a CHANCE to learn a trade; he can start in at $21.00 per month and in sixteen years be retired, independent; he can travel. If he is lucky enough he gets aboard a cruising ship—even then the chances are that his travels won't be as extensive as recruiting literature leads him to believe. The recruiter effectively describes the best side of Navy life in such manner as to lead the prospect to believe that it's a great life.

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Without a direct question, very rarely is any reference made to the unpleasant features. The applicant is sent in to the main station where the medical officer examines him physically, and both the medical officer and the officer-in-charge pass upon his mental and moral qualifications for the service. If he passes these examinations he becomes a recruit and leaves in the next draft for the training station. Every precaution is taken to prevent enlistments of undesirable characters and of men whose only object in enlisting is to get out of the city or state, so it is reasonable to assume that when a man leaves the recruiting station he is reasonably contented and enthusiastic and looking forward to the "Life of Riley." Bear in mind that the recruiter has technically done his duty! He has stayed within the law and the regulations. He has the recruit's age papers, and he has NOT MADE A SINGLE DEFINITE PROMISE excepting that he would be sent to a training station and that his pay for the first two months would be $21.00 per month. He has made no definite promises because there were none to make. There is an "IF" attached to every rosy statement. He perhaps has not mentioned the disagreeable things; why should he, when his job is to GET RECRUITS? Not only that, but unless he gets a certain number of recruits he is in line for transfer back to sea.

The recruit arrives at the training station and is immediately put in the detention unit, where he is face to face with some of the unpleasantness of the Navy. He is in strange atmosphere, doing strange things, even talking a strange language. The chances are that he is only a little over eighteen years old and he is being treated just the same as a man of thirty years who happens to be in the same unit. Homesickness appears; he becomes discouraged. He may reach the point where he throws up the search for travel, trade and an independent income and leaves on the first train for home. In due course of time he is declared a deserter, is apprehended and punished accordingly. It's the law; the "MAN" may be but eighteen or nineteen but that makes no difference; the law and discipline must be satisfied.

Another boy may be of sterner stuff; he goes through his training period, perhaps through a trade school, and is transferred to a ship. Maybe he travels, but probably he doesn't do much of it. Shorthanded as the crew probably is, his trade consists

principally of scrubbing paintwork or shining brightwork. On board some ships there is little or no effort made to handle the individual properly. Offenses for which a fine of $5.00 and costs would be adequate in a civil court may be punished by three months' loss of pay. Discouragement and lack of ambition, followed naturally by desertion or by a bad conduct or an undesirable discharge, are apt to result. The chief trouble—and in making this statement I realize fully the extent to which I lay myself open—is that the officers and the petty officers aboard that ship do not know how to handle men! They may be experts in gunnery or engineering or seamanship, but they do not know how to handle men.

The inflow into the Navy these days is composed chiefly of raw, green boys, potential men-o'-warsmen it is true; we need officers and petty officers who can take these boys and mold them along proper human lines. They must be treated as boys rather than as men, and as human beings rather than as something to fill a certain billet or to do a certain job. When a recruit comes aboard ship, the petty officers should take him in hand and make him understand that their job is not to force him to learn and to work, but to help him to learn and to work. They must make him feel, first of all a respect for discipline and for authority; but, tempered with that respect, a feeling of confidence in his superiors and of good will toward them, without which no discipline or no respect is worth a tinker's damn. There can be no proper discipline when there is undue display of authority or where the proper spirit of respect for authority is not engendered. The majority of these boys joining the Navy want to learn; they are like the rest of us; each one has somebody who is proud of him and who is interested in him. We are responsible for him and to a great degree for what he makes of himself. The responsibility of handling men is greater than most of us realize; and the kind of discipline we need is mostly good common sense and a sense of humor.

The only way to get proper results from any bunch of men is by leadership. A driver may get results, but if he does, he gets them along with the hatred and the disgust of his men for every symbol of authority. A leader always gets results and he gets lasting results because he pulls out everything good in his men;

his personality makes them want to respect authority, he knows the difference between discipline and abuse of authority, and his men know that he knows it. Through his leadership he gets the whole-hearted support of his men.

Too many of our officers and petty officers are neither drivers nor leaders; they come under that class of men who somewhere have gotten the idea that all orders should be passed along to the next in line and then be forgotten; the order goes down the whole list of division or department officers and petty officers and is promptly forgotten as soon as it is passed along. The idea is fine; in fact it is ideal in a smooth running organization, when the man who gave the order KNOWS it will be obeyed. But the Navy today isn't a smooth running organization; under present conditions this method develops first-class buck passers and the person holding the sack is our recruit, perhaps by this time a seaman first or seaman second-class. Whatever his rate is, there isn't anyone to whom he can pass the buck, and in all probability he is still unacquainted with the language of the sea.

There must be more personal contact between officers and petty officers and the men under them. Men must be treated less like a bale of hay or a spare part. Naturally it does not follow that there should be any lowering of the bars between officers and men; it does not mean that there should be more of the regrettable idea of being a "good fellow" which is prevalent among a certain class of officers. It does mean that in dealing with men, those in authority should make an effort to place themselves in the other man's place, and in nine cases out of ten you will find an unhappy, homesick, disillusioned boy instead of a potential criminal.

The condition is serious; the Navy is basically sound, but every part of the Navy is at fault. Officers and men are ordered to recruiting duty, not for any special ability they may have in judging men or in selling the Navy. Recruiting personnel, both officers and men, should be picked for their ability to judge men. If necessary, they should be trained along that line before they are ordered to recruiting duty. What civilian organization, employing the men the Navy does, would use such methods for employing them? How do I know whether any of the recruits I send in will be an asset to the Navy? I don't, and neither does

any other recruiting officer. An employment manager these days is an expert. A navy employment manager, in other words the navy recruiting officer, can know very little of modern employment methods. If there is no other way to do it, the Navy could very profitably support a high-class civilian business organization to do the recruiting.

The Navy Department is at fault because it offers nothing definite or tangible to a recruit. Our ships require men of the highest skill to operate them. Yet it is impossible to man the ships properly because we cannot interest the type of man we need.

One of the leading selling points advanced by the Navy Department in recruiting is the "Travel and See the World" idea. Yet how much traveling does the average bluejacket do in a four-year cruise? He gets no nearer most of the romantic looking places shown on recruiting posters than if he stayed on the farm. Certainly we don't definitely promise him that he shall see these places and it's probably only because the appropriation doesn't stand the strain that a great many more of them don't see these places. But some of our recruiting literature is expressly designed to appeal to a boy's wanderlust, and what happens if he hits a ship that never goes any place? Wouldn't it be a disappointment, to say the least, to any of us?

A large number of men desert or receive bad conduct or undesirable discharges aboard cruising ships. That is the most serious situation the Navy has to face but we might as well be honest. WE, ALL OF US, ARE AT FAULT some way. Half the men of the Navy are in the formative stage. We who have been in the service a few years know that the Navy is sound; we know and we love it for its traditions and for what it really is. The truth hurts but nevertheless the immediate solution lies in an honest self analysis of every officer and petty officer; if your men are dissatisfied or unhappy, if they are receiving bad conduct discharges or are deserting, walk up to a mirror, look in it and you'll see the cause of most of it. Let's get down to brass tacks; perhaps nothing can be done at present to correct the recruiting system or the training system, but every officer and petty officer can start immediately to correct and to eliminate in a great measure the cause of so many desertions and discharges.

PROTECTION AGAINST UNDERWATER ATTACK

By Lieutenant T. L. Schumacher (CC), U. S. Navy

Introduction

THE object of this article is to bring to the attention of the naval service a question of vital and increasing importance, which, it is believed, is not at present receiving the serious consideration it deserves from everyone interested in the efficiency of the Navy. Suggested courses of action are submitted with a view of directing thought on this important subject, but the writer realizes that the solution will result only from the combined attention of both the design and the operating groups of the service.

There is no attempt, either veiled or open, to introduce the much discussed line-corps question. The writer has no desire to enter into this controversy. If any statements are made, conclusions drawn, or courses of action suggested which appear adversely or favorably to criticize any particular group of the naval establishment, the reader is requested to maintain the same neutral attitude which, it is believed, the writer has maintained in preparing this article.

Historical

The advent of iron, power-driven ships some sixty years ago produced a subtle change in the standard of naval warfare. The drawn out, hand-to-hand fight of the day of John Paul Jones was replaced by the artillery duel where action was quick, and victory or defeat was decided in a single stroke. In the day of that great hero victories were frequently won by the stubborn resistance of a crew on a seriously damaged vessel. With the new form of fighting injury became catastrophic. The vessel was sunk by a single well-aimed blow of the enemy. The crew was not given the opportunity to continue the fight, once the ship was severely damaged. Defeat must be accepted. The standard of resistance was lowered. This change is aptly ex-

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pressed in the paraphrase "Wooden ships and iron men, and iron ships and wooden men." The very plan of battle was altered to suit the new conditions; as shown by the great emphasis put on the advantage of delivering the first blow.

But history is repeated, and once again a crew of "iron men" may keep a ship afloat and fight her to victory, after she has received the full attack of the enemy, and sustained an injury which, but a few years ago, would have been considered mortal.

Two recent developments of naval warfare which have taken place within the last two decades are exercising a profound influence on the construction and handling of warships. These developments are:

(a) The increased effectiveness of torpedoes and mines as offensive weapons.

(b) The increased ranges at which main battery guns may be accurately fired.

Increased Effectiveness of Torpedoes and Mines. Torpedoes proved their worth as practical offensive weapons, under war-time ranges and conditions, for the first time in the late war. Mines, previous to that war, had been used only as weapons of defense. The World War, however, saw them very successfully and effectively used for offensive action.

Increased Ranges of Main Caliber Guns. The development of fire control and airplane spotting has shifted the limitation of range from the control to the gun. Up to a few years ago our guns were better than our control; that is, we could shoot farther than we could aim. Our control is now better than our guns; we can aim farther than we can shoot. *Battle ranges are, therefore, the maximum ranges of the guns.*

These two developments are matters of common knowledge. They are familiar not only to the naval profession but to the general public as well and therefore require no general discussion.

Exposition

An enemy's attack may be met by two methods; defense and protection. By defense is meant those measures whereby his attack is checked before it matures. By protection is meant those measures whereby his matured attack may be received without serious injury. A well-directed attack of a powerful enemy can

be met successfully only by the use of methods of both defense and protection. Man instinctively resorts to defense first; protection is always a secondary measure. The development of methods to overcome the danger of underwater attack has followed this rule. We have developed defensive measures, such as high speed, accurate and rapid fire of secondary battery, camouflage, depth bombs, mine sweepers and paravanes to a high degree of efficiency; but the development of protective measures has been given little consideration by the Navy as a whole. Although we have considerably reduced the danger of underwater attack by reducing the chances of its maturing, we have not greatly reduced the danger if the attack does mature. In this article it is proposed to discuss this rather neglected question of protection against a matured underwater attack.

This discussion will be confined to capital ships. Much of it also applies to ships of all classes, but the particular requirements of each class are beyond the scope of this article.

Underwater attack is a reality. Torpedo and mines are offensive weapons which an enemy will utilize whenever possible. We must, therefore, provide our ships with as efficient a protection against this attack as possible. Some form of protection is now being incorporated in the latest capital ships of all navies, and its importance is indicated by the fact that it is now considered as necessary by the designer as the above water protection against shell fire; that is, the possibility of the loss of the ship from underwater attack is now as great as the loss from gunfire.

Underwater protection differs from above water protection in three respects, as follows:

(a) Adequate armor will stop a shell at or very near its point of impact, but at present there is no known means of keeping an explosion from entering a vessel once the torpedo or mine has exploded against its shell.

(b) Protection against shell fire is, in most cases, one hundred per cent efficient if the shell is kept out of the vital parts of the ship. Underwater protection must, to attain this efficiency, not only keep the explosion out of the ship's vitals, but it must also be so designed and operated as to keep the resultant entrance of water from the ship's vitals, as well as to maintain to a certain degree the seaworthiness of the vessel

after the explosion has occurred. Damage by shell fire near the water line takes the nature of underwater attack in this respect, and is included as such in this article.

(c) Protection against gunfire is almost entirely passive; that is, the armor is built into the ship and it affords the necessary protection without any action on the part of the ship's company. On the other hand it follows from (a) and (b) above that protection against underwater attack, to be effective, must be operated properly by the personnel on board at the time and immediately after the attack occurs.

The operating group of the Navy has been well trained in the method and theory of protection against gunfire. This protection requires no routine action on the part of the ship's company. As this protection was the only common form on ships up to the past few years, we have grown into the idea that all protection is passive. The idea that protection, to be effective, may require action on the part of the ship's personnel is a new one which, it is believed, has not yet been generally received by the naval service. The ideal protection is one which operates automatically when called upon, and perhaps the operating force may feel that the designer has not fulfilled his mission until he produces a protection against underwater attack, which, like armor, may be built into the ship and then forgotten. Forms of underwater protection which operated automatically have been designed and installed, but have been found to possess such serious objections in practice that they have been discarded. The designer has so far been unable to produce a successful automatic protection against underwater attack, and the latest designs in all navies are based on the principle that the ship's personnel will operate the devices installed, when they are called upon to offer protection against attack. It is not believed that the operating group appreciates this basic principle, nor accepts it as an actual condition, which it is.

Discussion

The following steps are necessary if our ships are to be capable of properly resisting underwater attack:

(a) The importance of underwater protection must be properly appreciated both by the design and operating groups of the Navy.

(b) The designer must meet, so far as possible, the demand for adequate protection, and equip our vessels with the necessary material and devices for its operation.

(c) The design group must furnish to the operating group all information as to the principles of operation of the devices installed, and the necessary data for their efficient operation.

(d) The operating group must completely understand what protection is incorporated in the design, what its principle of operation and limitations are, and must be able under all conditions properly to operate the devices installed.

The Importance of Underwater Protection. A realization of this may better be obtained by an understanding of what effect underwater damage has on a vessel. This effect may be broadly divided into two classes:

(a) The vessel will lose some or all of her buoyancy. In the latter case she will, of course, sink.

(b) The vessel may lose some or all of her stability. In the latter case she will, of course, capsize.

With modern designs the reserve buoyancy is so great that it seldom occurs that sufficient water is admitted entirely to destroy the ship's buoyancy. Indeed, even an extreme loss of buoyancy alone has no serious effect on a modern battleship, other than slightly reducing her speed, somewhat decreasing the efficiency of her armor and, under some conditions, slightly reducing her seaworthiness.

The stability of a vessel is, however, a quality which is more susceptible to damage. In nearly every case of underwater damage the ship, if she does not capsize, at least takes a more or less serious list or severe trim. We will, therefore, confine our attention to the effects of lost stability.

These effects may be broadly classified as:

(a) The ship lists over so far or takes such a severe trim as to become either unmanageable or unseaworthy.

(b) The ship's transverse metacentric height or range of stability may be so reduced as to render her unseaworthy or cranky.

(c) The ship may take a moderate list or trim which does not seriously impair her seaworthiness but greatly reduces her

fighting efficiency. By moderate list is meant a list of not more than twelve degrees.

(d) There may be a combination of (b) with either (a) or (c). List and change of trim may, of course, occur simultaneously.

In case (a) nothing can normally be done to save the ship. However, as will be shown later, these effects are rarely produced directly, by even two torpedoes or mines acting simultaneously. Also, with a proper design, effect (b) is rarely so pronounced as to be dangerous.

Result (c), that is a moderate list or trim, is by far the most common effect on a naval vessel, and is therefore the one demanding most consideration.

What effect has a moderate list on a ship? In time of peace, although it may be great enough to influence her seaworthiness somewhat, the situation is not serious, and, if she is properly handled, no harm will result other than making her a very uncomfortable vessel for the personnel on board. It is the effect on her fighting efficiency which requires much thought.

In time of battle a vessel stands at least an even chance of receiving a torpedo or mine on the engaged, rather than the un-engaged, side. Battle ranges of the future will be the maximum gun ranges. A battleship in action is torpedoed (or mined) on her engaged side, as a result of which she takes a moderate list of, let us say, eight degrees. The maximum angle of elevation of the guns relative to the horizontal is decreased by the angle of list. The maximum range is thereby decreased by about two thousand yards. Her speed is slightly reduced under the list. Under such conditions an enemy vessel of the same, or even somewhat less, normal fighting power can choose her own range, stand off beyond the reduced range of our listed ship, and dump any number of salvos into her with perfect immunity. The enemy's action will, of course, be determined by the nature of the battle, whether it is a fleet action or ship-to-ship fight, but in any case our listed vessel is at his mercy. We may imagine our vessel to be manned by the most efficient captain, the four best turret crews, and the best engineer's gang in the world, and her fighting efficiency under such conditions would still be practically

zero, merely because of a moderate list of eight degrees. The cost of the ship, the time and energy spent in training her crew, are wasted and, more important, the ship is lost and our fleet is weakened because she has received an injury which in itself, would mean nothing more than a slight inconvenience to her crew. Does not this picture alone convince us of the importance of the problem of underwater protection?

The above discussion presents the most serious effect of a list because in battle time it is the all-important element. If such a condition obtains for only a few moments the ship may be lost. In battle, then, the ship must be righted immediately.

It is not contended that such will always be the result of a list in time of battle. The range may be such that even a severe list will not bring the guns below the necessary elevation. The vessel may receive the underwater damage on the unengaged side; or, if received on the engaged side, she may, in rare instances, be able to reverse her course, thus presenting her high side to the enemy. But the disastrous conditions described above may obtain. Is it not too serious a matter to leave to chance?

The ship's fighting efficiency will be reduced by a list, in the following respects, whether the list be toward or away from the engaged side:

(a) Ammunition is difficult to handle and guns hard to load. The rate of fire will, therefore, be reduced.

(b) The nature of the ship's roll may be considerably changed, thereby reducing the accuracy of director fire.

(c) Defense against submarine attack on the high side may become ineffective at short ranges, because the secondary guns could not get down to the target.

(d) The efficiency of the armor protection is reduced. If the list is toward the engaged side, the vertical armor becomes submerged and the decks, which are not armored to receive the impact of a large caliber shell, present a considerable projected area to the trajectory. A list away from the engaged side, even though moderate, may, in rough weather, bring the lower edge of the vertical armor above water, thus exposing the unprotected side to direct impact.

(e) Much of the machinery operates partly by gravity,

With a list this force is displaced from its normal line relative to the ship. As an example the water surface in the boilers will be inclined, which may even uncover some of the heating surfaces. The weights of all moving parts will be thrown on bearings in abnormal lines, which will result in decreased speed of operation or even in completely disabling the mechanism. These results will, of course, be felt whether the ship is in battle or not, but in the latter case they may be reduced by proper care and attention in operation, while in time of battle no such attention may be given without disturbing the ship's fighting organization.

These difficulties and many others may be appreciated properly only by one who has attempted the various routine operations on a vessel listed even to so small an angle as five degrees.

Concluding, as we must, that a list is liable to be encountered in battle, and that it may, even though moderate, result in the loss of the ship and certainly will considerably reduce her fighting efficiency it becomes absolutely necessary that a means be provided for reducing a list quickly and efficiently under battle conditions.

The designer must meet the demand for adequate protection.

It is not deemed desirable to discuss this requirement in detail in this article. In general, underwater protection operates in three ways:

First—To restrain the explosive forces from entering the vital parts of the ship. As stated above the explosion cannot, by any known practical means, be confined to the point of impact. Obviously, then, the vital parts of the ship must be removed from the point of impact. This is done by withdrawing the vital parts from the ships's side, and stowing, in the intervening spaces, material which can be lost in action without affecting the fighting efficiency of the vessel. The construction of these side spaces must be such as to absorb the force of the explosion. The material stowed in them may be relied upon to increase their capacity in this respect.

Second—To restrict the inflow of water, after the explosion has been dissipated, to a minimum space. This is accomplished

by the division of the ship's underwater body into small watertight compartments.

Third—To provide means for draining and flooding compartments, so as to keep the ship erect. This is accomplished by the proper flooding connections, drain lines and pumps. Whether or not the present installations are sufficient and satisfactory must be decided by the operating force.

The methods of accomplishing these purposes are not a perfect development. Much progress is yet to be made. However, at present, a capital ship will withstand two torpedo or mine explosions and still remain afloat, very nearly upright (within twelve to fifteen degrees), and fairly seaworthy. For this reason it may be said that the stability effects (a) and (b) above, will seldom be encountered; that is, a modern capital ship will seldom, if ever, list over so far, as to become unmanageable; nor will her stability be so much reduced as to make her unseaworthy, as the direct result of a torpedo or mine explosion. Examples may be presented which appear to contradict this statement, but in all such cases the disastrous effects have been caused by events secondary to the explosion proper. This will be discussed later.

Briefly, then, we may say that, so far as the probability of the vessel's being lost from the direct effects of a torpedo or mine our protection has been made automatic, and requires no attention of the ship's force other than to see that it is kept in proper condition.

The design group must furnish to the operating group all data necessary to the operation of the protective devices installed.

Besides a general statement of the operation of these devices, the following data should be furnished in the form of readily accessible graphs and sheets:

1. Size, location and use of all compartments.
2. Flooding and drainage connections to all compartments.
3. Time required to flood and drain all compartments.
4. Sequence of compartments as regards availability for flooding.
   (For example certain storerooms should not be flooded except as a last resort.)
5. Resultant change of mean draft, list, and trim due to flooding each compartment.

6. Resultant change of transverse metacentric height and range of stability due to flooding a compartment if such change is of serious magnitude.
7. Location and means of operation of all flooding and drain lines, pumps and valves.
8. Means of access to all compartments, both under cruising and battle conditions.
9. All doors and hatches to be closed, and routes of passage to be followed in time of battle indicated.

The operating group must understand and be able properly to operate the protection installed. This requirement can be met only by:

(a) Having a recognized group to perform these duties, with a properly indoctrinated officer at its head.

(b) Training and drilling this group into an efficient organization, in which each man realizes his responsibilities, knows his duties, and understands the general method of operation of the whole system.

The duties of such an organization have fallen to the first lieutenant. It is suggested that, whatever position the head of this group occupies in the ship's organization, he be known as the "stability control officer" in the battle bill, and his group be known as the "stability control group." The stability control officer should be familiar with all parts of the ship, and should particularly appreciate his responsibilities in battle. He should be familiar with the graphs and sheets containing the data enumerated above. He should have a permanently located battle station. In this station these graphs and sheets should be so arranged as to be instantly accessible. He should not be required to leave this station in time of battle except in extreme cases.

The mission of the stability control officer should be to keep the ship afloat and on an even keel in time of battle, and no additional duties, such as taking charge of topside casualties, should be assigned to him, if they interfere with this mission.

It is suggested that an officer familiar with ship design and construction, buoyancy and stability, and the theory and practice of water-tight division, would be best suited to this duty.

The stability control group should consist of enough men so

that one man could be assigned only as many valves, lines, or pumps, as he could properly and expeditiously operate. The men of this group should be chosen carefully with a view to picking only those who would appreciate their great responsibility. These men would have to operate under remote supervision; consequently only the most reliable should be put on these stations

There should be a separate interior communication system, connecting all stability control posts with the stability control station. This system would be the only regular medium of communication between these points.

The battle duties of the stability control group should be supplemented by cruising duties. When cruising in time of war in dangerous waters, a skeleton crew should be on watch at all times, to see that the designated doors and hatches be kept closed, and also so that immediate steps could be taken if the vessel were torpedoed or mined.

The proper training of such a stability control group will be a very difficult matter. Each man must be able to find his way about his part of the ship and operate the valves or pumps assigned to him under all conceivable conditions. The control officer could become proficient in his duties only by long and conscientious study and application. The group should be drilled, individually and as a unit, daily. These drills should be supplemented by occasional actual battle condition drills. *It is suggested that it be made a part of the battle efficiency inspection to flood compartments without previous knowledge of the stability control officer, and the time taken, and the method and efficiency in bringing the ship back on an even keel, be given due consideration in determining the vessel's general fitness for battle.* This suggestion will be entertained with some apprehension by the average commanding officer; but, if the idea that a vessel may be partially flooded and still be safe, is to be accepted, no better way of growing accustomed to such a condition can be suggested. It is believed that this very apprehension is an indication of the necessity for such a drill. If we cannot safely right a ship under the ideal conditions of drill, how will we ever do it under battle conditions, when the attention of the commanding officer and most of the ship's company is of necessity engaged with other matters? Efficiency in gunnery is attained by gunnery

exercises; efficiency in underwater protection can be attained only by flooding exercises. *The thought that the ship's side is a dead-line beyond which bodies of seawater must never pass, must be dispelled if a satisfactory underwater protection is to be developed.* Such a drill could not, of course, be attempted until the stability control group becomes a thoroughly efficient organization, through preliminary simulate drills.

The stability control officer could only fulfill his mission in battle if he were made solely responsible for the integrity of the watertight division of the ship. It is believed that the importance of the integrity of watertight bulkheads and decks is not generally appreciated, although conditions have certainly greatly improved in this respect in the last five years. The experiences of many vessels in the World War testify to the fact that boundaries of watertight compartments have not been regarded with the proper respect. Every man in the crew should be warned of the dangers of cutting even a small hole through one of these boundaries.

We are inclined to mistrust the strength of watertight bulkheads, and have made it a part of the battle drill to supply temporary shoring. Bulkheads are built sufficiently strong to withstand any pressure ordinarily met with, and it is suggested that some effort would be saved by giving this phase of the question less attention.

Bulkheads and decks are of necessity pierced by doors and hatches. These openings, when not properly closed, destroy the integrity of the boundary which they pierce. This serious question has been partially settled by reducing the number of these openings to a minimum, many times at the expense of efficient operation in cruising condition and the convenience of the operating force. The openings installed are all provided with suitable means for closing them watertight. If the necessity for making the stability control officer responsible for the proper operation of watertight doors and hatches, and the placing of a crew of men on these openings in dangerous waters, is doubted a review of the reports of casualties during the World War will remove this doubt. It is remarkable how many of these contain such statements as "The water spread to the adjacent compartment due to leaks through the watertight bulkhead" or "Watertight door (or

hatch) number——could not be closed properly, and compartment number——was flooded." These same bulkheads and doors were put to a much more severe test when the ship was built than they underwent at the time of the casualty. Why did they not perform their functions properly when called upon in service? With the stability control officer put in complete control of this question, it is believed that such reports would be less frequent, and lost ships in time of war less numerous. The evidence in almost every case of the loss of a capital ship by torpedo or mine in the World War indicates that the loss was not due to the direct effect of the explosion itself, but was caused by these secondary effects which would not have resulted if the integrity of the watertight boundaries had been maintained. It was not maintained in some cases due to improper design; in other cases due to improper operation. It is believed that defects in design have been greatly reduced in the later ships. Has the standard of operation also been raised?

With such an organization as the stability control group, a modern man-of-war will be well nigh invulnerable to any torpedo or mine attack likely to be met in the war of the future. The almost irresistible power of underwater explosion will be dispelled, and the grave fear of mines and torpedoes experienced by every seaman in the late war will become a thing of history. Unless some such measure is adopted, however, underwater attack will, in the near future, attain such a degree of efficiency as to enable an enemy, under favorable conditions to render a whole fleet helpless without firing a gun.

We preserve and cherish Lawrence's familiar order, but it has lost the meaning which he put into it. We hear it frequently quoted, but, with few exceptions, it is applied in a figurative sense. But once more a vessel may be all but lost, under the power of the enemy's underwater attack, and yet be kept afloat and fought to victory by the "iron men" aboard of her. To the crew of such a vessel will be revealed the glorious old meaning of the words—"Don't Give up the Ship."

Conclusion

Some of the courses of action suggested in this article are already being followed, at least in part. They have been incor-

porated in the discussion so as to maintain continuity. The suggestions as to new methods and courses of action have been made with some hesitancy. It is appreciated that they are incomplete, and the details perhaps not entirely practicable, due to conditions not familiar to the writer. The suggestions are made in the hope that they will cause some additional consideration to be given to this subject by the naval service in general, and form a basis for further discussion. If this hope is realized, the object of this article will have been attained.

THE LAST CRUISE OF THE *UB-88*

By Lieutenant Commander J. L. Nielson, U. S. Navy

1. War History

THE following brief War History of the *UB-88* was obtained from the British Admiralty Office in London, by Naval Operations, Washington:

"*UB-88* is a small ocean going type of submarine carrying one gun, ten torpedoes and a crew of about thirty officers and men. She was commanded by Kapitän Leutnant Von Robenau.

"She probably did her trials in February and March 1918, but did not leave Germany until the first week in June.

"She proceeded to the vicinity of Flamborough Head on the east coast of England, where she sank two steamers. She apparently had been alloted to the Flanders Flotilla, since she proceeded south and arrived at Zeebrugge on June 12, 1918.

"She left there on June 20, and proceeded again to the east coast of England where she sank six steamers. She was back in Zeebrugge again on July 1.

"On July 29 she left the Flanders coast and then proceeded via the Straits of Dover into the English Channel. Her area of operations during this cruise was probably off Brest, where she torpedoed steamers.

"She returned to Zeebrugge on August 11, having again passed the Straits of Dover.

"Her next voyage commenced about September 12, when she again proceeded via Dover to the English Channel. (She is believed to have been the last German submarine successfully to have passed Dover Straits.)

"This time she operated in Tor Bay for about a week, sinking four steamers. She then decided to return to Flanders via the north of Scotland, and arrived at Zeebrugge on September 29, only to find the complete evacuation of the Flanders coast was taking place.

[Copyright: U. S. Naval Institute, Annapolis, Md.]

"She was forced to leave there for Germany on October 1, and probably arrived in Germany on October 5.

"She surrendered at Harwich, England on November 27, 1918."

II

General Description

Following is a more complete general description of the important features of the *UB-88*:

German submarines were divided into several classes, depending upon the work they were to perform. One type was wholly used for torpedo work, another was a combined type which carried both torpedoes and mines, and a third consisted of the mine-layers, which carried mines only. These vessels were again divided into classes according to their sizes and dates of construction.

The *UB-88* was a small straight torpedo type of submarine, carrying ten torpedoes, one 8.8 cm. gun, and bombs which were used for destroying surrendered merchant vessels. She was propelled by two six-cylinder, four cycle, 450 revolution, 550 H. P. reversing Diesel engines. Connected to the engine shaft by means of friction clutches are four electric motors, (two on each shaft) which are used to propel the vessel in confined waters and when submerged. They are of about 325 H. P. apiece. The power for these motors is obtained from a 124 cell storage battery, divided into two groups of 62 cells each.

TORPEDO TUBES

The vessel has five torpedo tubes, four of which are located in the bow and one in the stern. They are so fitted that the torpedo can be charged with air while in the tube, and also to allow the depth setting and curve fire angle to be changed. The torpedoes are fired from the tubes by means of compressed air contained in the impulse tanks, located in torpedo rooms, eight forward, two aft.

PERISCOPES

There were two periscopes of the walk-around type, of zero and six power. They were fitted with two small shifting levers, one to shift high and low power, and one to shift the objective

prisms to elevate or depress. Both are housing periscopes. The after periscope well contained an elevator. This periscope could be raised and lowered by motor or hand.

AIR FLASKS

There are ten air flasks located between inner and outer hull, above water line, with exception of Nos. 1 and 2 groups, which are located in central control room and pump room. These flasks can be charged from the engine air compressor or from the auxiliary compressor, also in engine room, and were usually charged to 160 atmospheres. Each flask group has a separate line to the high pressure manifold.

OXYGEN

There are ten oxygen flasks, seven forward and three aft. These can be charged from ashore while in the boat. They are connected to manifolds fitted with charging caps used for charging small bottles on escape helmets.

BUNKING ARRANGEMENT

The boat has bunking facilities for a crew of twenty-seven men and three officers. There are four bunks for chief petty officers in a separate compartment, and a cook's bunk near the galley. Due to very poor ventilation the latter bunk was considered unfit for use at sea. The crew's bunks are located partly in the torpedo compartment and partly in the after battery compartment.

GROUND TACKLE

There is a patent anchor housing in the superstructure, starboard side, weighing about 1,000 lbs. It is fitted with 120 fathoms of 3/4" stud link chain and it can be controlled from the deck or torpedo room. There is a small compartment built in No. 6 ballast tank to receive the chain.

DECK ARRANGEMENT

The deck is fitted with lockers, that serve as stowage space for lines, and ready ammunition for deck gun. Forward of the torpedo hatch there is a large locker that served for boat stowage. The ammunition lockers are constructed of very light material

and were intended to be water-tight. The mooring arrangements consist of cleats and bits that can be housed in the superstructure while underway. There is a tripod fitted on the forecastle to which is fitted a saw tooth net cutter. This tripod also serves as a guide and brace for the clearing lines. These clearing lines run from the bow up over the tripod, over the braces on the wings of the bridge, to the stern and are there fitted with turnbuckles. They also serve as an antenna support for the radio. There are two cradles or beds, one forward and one aft, on deck that served as housing for large radio masts that could be raised and lowered. These were not installed. There are four hatches, the forward or torpedo hatch, the conning tower hatch, the engine room hatch (which is on an angle to receive torpedoes), and the galley hatch.

BRIDGE

The bridge is of the open chariot type, constructed of a light bronze extending 3/4 way around, the after end being enclosed by a rail. A small periscope cut-water comes up through the center, standing about two and one-half feet in height. On the after end of the bridge there is an insulator for the radio and a telescopic flagstaff. In the center, forward and on either wing of chariot there are fitted permanent pelorus dials with a portable sight for same. The running lights are permanent fixtures on either wing of the bridge.

HOLDS

There are three holds in the forward torpedo room and two in the central control room. The one on the starboard side of torpedo room is for fresh stores, one on the port side for dry stores and one for miscellaneous stores. One vegetable locker and one reserve ammunition locker are located in central control room. The torpedo room bilge is fitted with brackets to carry spare torpedoes.

MAIN BALLAST TANKS AND VENTS

These are six in number. No. 1 is located in extreme after end of ship, capacity about 5 tons; Nos. 2 and 3 located in engine room, capacity about 15 tons each; No. 4 located in central control room, and extends into cabin; No. 5 in torpedo room, and No. 6

forward. Nos. 1 and 6 have one flood valve or Kingston, while Nos. 2, 3, 4 and 5, are fitted with two. There are two blow lines to each tank, one from high and low pressure and one from the turbo blower. Vents are installed at four parts of superstructure. Nos. 1 and 6 ballast tanks have single pipe to the vent dome. Tanks Nos. 2 and 3 (main ballast) vent to one dome aft of conning tower fairwater. Tanks Nos. 4 and 5 (main ballast) vent to a single forward of the torpedo hatch. Tanks Nos. 2, 3, 4 and 5 can be vented independently or in tandem by master vent controlling shafts in the central control room. There are no inboard vents on these tanks. The only way of determining whether or not these tanks are full is by trying the pet-cocks in vent lines.

BLOWER MOTORS AND VENTILATING SYSTEM

There are two blower motors, situated one on the port and one on the starboard side of the forward end of engine room.

The ventilating system is so installed that one or both motors may take suction from battery or compartments, or both at the same time. The system is also aranged so that starboard motor may take suction from outside of boat and discharge fresh air inside boat or battery, while port motor takes suction from boat and battery and discharges overboard. This method gives the best results.

LIGHTING, HEATING, AND COOKING SYSTEMS

There are two distribution boards for lighting, one in motor space and one near central control room. One board feeds lights on starboard side and the other feeds port side. One or both distribution boards may feed from either battery. If one board or one battery is out of commission, half of the lights in each compartment remain in commission.

Each compartment is fitted with a receptacle to plug in a portable electric heater. These heaters are about the same as the American type except in shape, being about 12″ x 12″ x 16″. Current is obtained from power circuit.

The galley is fitted with an electric cooking system, taking current from after distribution board. Large portable pots, varying in size from one to twenty gallons are used, each containing

its own heating coil between the inside and outside shell. Different degrees of heat may be obtained by shifting the plug, which may be plugged in four positions.

GYRO COMPASS

The Gyro Compass consists of three A. C. 90 volt induction motors 120° apart, suspended on an inner gimble ring, which floats in a Mercury bowl. The main voltage, 125 D. C. comes from ship's mains to motor generator set, which converts and steps it down to 90 volts A. C. The rotors are about four inches in diameter and weigh about ten pounds each. They spin in the air as there is no vacuum chamber on the compass. The repeater system is operated by a three-phase motor, turning a shaft with a row of contacts, which cut in simultaneously the field poles in the step by step motors in the repeaters. The three-phase motor is operated back and forth by having one phase split with each side connected to contacts on the inner compass standard. When the compass finds its course the hunting motor on bottom of compass moves the two contacts so that the motor contact will be between them and keep the repeater in stop. All the repeaters are D. C. The lights are dimmed in the repeaters by cutting in resistance.

ARRANGEMENT

The interior arrangement is very poor. Repairs at sea are almost out of the question. This is due to the inaccessibility of the parts which are most likely to get out of running order; for example; the main motors and fields are directly below the switchboards in heavy casings. In order to remove a motor or field coil it is necessary to remove a section of the hull. The pumps are located behind or under a network of piping and cables.

The *UB-88*, although of only about 750 tons displacement, is an excellent sea boat. This may be accounted for by the fact that the boat is of the saddle tank type, which gives larger beam dimensions for small tonnage.

III. History Continued

The *UB-88* lay moored in the "Trot," Harwich Harbor, from the date of her surrender, November 27, 1918, until March 13,

1919. On the latter date the *UB-88, UB-148, UC-97, U-117, U-140,* and the *U-111* were allocated to the United States by the British Admiralty. The first five named were at Harwich, the *U-111* was at Plymouth. On March 11, 1919, six officers and 100 men from the Submarine Base at New London, Conn., and about thirty other men detailed from the various U. S. naval stations in the British Isles, arrived in Harwich to take over these boats. Several officers were already in Harwich, having been sent there from the U. S. Naval Headquarters in London.

About fifty per cent of the men had had previous submarine duty, while all the officers were experienced in submarine work. The problem before us was to learn the boats, train the crew and sail under our own power for the United States at the earliest possible date. As these vessels were to be used in connection with the Victory Loan campaign, it was desired to hasten their arrival in New York. With the above problem in mind, we set about to solve the task allotted to us.

The German submarine is, naturally, a distinctive type. True, all submarines are built upon the same general principles, in that they have ballast and trimming tanks, diving rudders, motors, engines, etc. Still the arrangements and installation of all this material may be such as to present to a person who has had experience operating one type, a vessel in which everything will appear entirely different. Our previous experience was to be sure, of great value to us, but on account of the design of the German submarine it was necessary "to learn" these boats in every particular. For example: it is a very simple matter to blow tanks on a U. S. Submarine——but the problem was, how to blow them on the *UB-88.* First it was necessary to learn the operation of the German type of air compressor. Next to learn the air distribution system to the different parts of the ship, then the leads to the air flasks or accumulators, then the leads from the flasks to the manifolds and from the manifolds to the tanks. This would put air into the tanks but it was further necessary to learn the operation of the ballast Kingston and the ballast vents. Then if you had been successful in following out the leads and valves, the problem was solved. This appears, no doubt, simple, and under ordinary conditions it would be, but the German arrangement of piping has not that beautiful symmetry found in

our boats and a pipe may wind in and out among its fellows in such a way as to present a veritable Chinese puzzle. Blue prints and drawings were luxuries we did not enjoy, for all these had been very carefully removed.

The cleaning, repairing where necessary, tracing out fuel oil lines, lubricating oil leads, air lines, water lines, ventilating pipes, battery leads, lighting circuits, took up a great deal of time allotted before the moving parts could be tried. All the name plates, naturally, were in German. We found that the German phraseology used in engineering was not the same we had learned in school. The amount of work necessary was apparent and the conditions under which we worked can be imagined.

The *UB-88* was in a filthy condition. Food had been left aboard after she had surrendered. The remnants of the last meals had been thrown in the bilges. The stench from the galley was unbearable. Rust covered all the piping. The engines were one mass of corrosion. The torpedoes had been pulled from the tubes and thrown on the torpedo room deck. The air flasks and after-bodies were coated with rust and badly pitted. The storage battery was almost run down, not having had a charge for over four months. The bilges were full of oil and water. Many parts of the boat had been taken by souvenir hunters while she lay moored in Harwich. The eye-piece on the forward periscope had been broken off and the reflecting prism and lens removed. The stabilizer had been taken from the gyro compass, as had also the azimuth motor. The magnetic compass had disappeared. Out of the dozen cooking utensils on hand, only one would cook, the rest had been smashed or the coils burned out. There were no mess gear, mattresses or blankets. There were no spare parts for the engines. Parts of the radio set had been stolen and the rest smashed in with a hammer. The repeaters for the gyro compass now decorated the homes of the British as souvenirs of the war.

So many parts of the equipment were out of commission that it was decided to find out first what would work, then go after the parts that would not. This system was followed out. Everything was tested and report made whether or not it was in running order. If not, what was wrong, and what was needed to fix it. In a very short time we had a good estimate on just what we had to do.

To illustrate our method; The radio set, as stated, had been demolished. The motor generator was there and would work, but sending and receiving sets were almost completely wrecked. By rummaging through about a dozen of the submarines still remaining in the "Trot," which were going to be sold for junk, we collected enough material to complete a sending set. We were unable to find a detector, however, so that had to be purchased in London, and with parts of a receiving set "stubbed out" from the U. S. S. *Chester,* the radio outfit was complete, but not efficient. Probably it was the lack of harmony, due to the combination of English, German and American parts. Who knows? It was impossible to improve on the set until the arrival of the U. S. S. *Bushnell.* She had on board six complete outfits. By the addition of a quench gap and an audion bulb to what we already had, the outfit from one of these sets was connected up and tested. Our reward was a set with a hundred miles radius, which was sufficient for our needs.

I stated before that the magnetic compass had been removed. Search was made through all the German submarines lying in the "Trot" and none could be found. A U. S. Naval Vessel donated one, but it had been lying idle for so long in one position without any liquid in the bowl that the magnets had lost practically all their directive force. There was not much hope in getting good results from this compass, but nevertheless it was installed, and after filling the bowl, an attempt was made at compensation on one heading. That night before turning in I looked at the compass and it showed the heading NNW 1/4″ W, which was about correct on magnetic North. I looked at the compass the next morning with the ship headed in the opposite direction (having swung with the tide) and it still showed us headed NNW 1/4″ W. All the compensating magnets were removed but true to her straight forward aim in life, the compass never moved a fraction of a degree and for aught I know she still heads NNW 1/4″ W. A call was made on the Senior Submarine Officer at the British Submarine Base, and after a "search" he supplied us with a compass which had been taken from one of the German submarines. This was installed but on account of the binnacle being placed inside the chariot bridge, its operation was slow and sluggish. A make-shift stand was then installed between the peri-

scopes on the periscope sheer. A block of wood placed directly under the center of the compass and bored with several holes at right angles, served admirably as a compensating rack and in this "rig" we placed our hopes. True the steering wheel was about ten feet from the compass, but I don't think we worried much about that at the time.

The German (Anshütz) type of gyro compass was a source of mystery. The stabilizer had been removed as had also the azimuth motor. By again visiting several of the boats up the "Trot," an azimuth motor was found and connected up. Also on the same trip we were fortunate in getting three repeaters in good condition. A stabilizer, however, could not be found. There was no one aboard who knew the interior construction of this type of gyro and in consequence no one knew how to operate it. By tracing up the leads from the compass, we found the motor generator and the power leads from the switch boards. That much settled, we went after the compass and by a process of trial and error, it was finally started, and much to the surprise of everyone, it worked satisfactorily. A four degree easterly deviation was removed by balancing the rotors with sealing wax placed in the compass levels to compensate for the loss of alcohol from the levels, which had been broken. The compass is still running perfectly. It has never shown any tendency to "get off" the Meridian even in the roughest weather.

The drainage system was of course, a vital problem, although a simple one. Trouble was experienced with the after trimming line pump and it has never been in good condition. The adjusting pump, just abaft the central control room, was working and as it could be connected up to all the bilges through the manifolds, full confidence was placed in this pump. If it had broken down completely the novel situation of bailing out a submarine with buckets or the use of a handy-billy would have resulted. Nothing else could have been done.

As the safety of the boat on the trip from England to the United States was a paramount factor, it was thought advisable to dock the boats at Harwich before sailing. The underwater hull and all tanks were minutely examined. New Kingston gaskets were installed where necessary. The trustworthiness of our late enemies was never mentioned, still I do not doubt

that it was in everyone's mind during the period of preparation. However, let credit be given them where it can, for we found no tampering of any kind. The boat was in dock two days, during which time very little opportunity was had for any progressive preparation. After undocking, however, we again turned to.

The engines were the most important part of the equipment to prepare for operation. I think that everyone who worked on the engines did so with the determination to make them run as well or even better than the Germans had done. It was this or admit that the German crew was the better of the two. Looking at it in that light, the determination to succeed in the preparation of them was to everyone a matter which touched the most delicate spot in the human make-up—Pride.

In beginning to learn the engines and auxiliaries, we were in the dark, except for our general experience with Diesel engines and the intimate knowledge of a few types which are used in our own service. As all engines of this type operate upon the same principle it was chiefly necessary to locate the supply, the discharge, if any, and the power of delivery of the circulating water, the air, and the lubricating oil. In the case of the fuel oil, the tanks were first located, then the leads, to the gravity feed tanks, and then the valves and pumps controlling the delivery to the engines. At the same time the fuel compensating system was traced out. The lubricating oil system was followed out and tested in the same way as was also the cooling water. In order not to forget the thousand and one valves with their German names, shipping tags were placed on each valve and gage. On these were written the use of the valve and how to operate it. The explanation of this procedure is brief and to the point and one would judge that we were occupied probably one or two days in this work of tracing out lines and tagging them. But so complicated and intricate was the German system of piping and valve arrangement that the time consumed before we were ready to start the engines was fourteen working days. When everybody had been properly prepared for our first trials of the engines, they were jacked over by hand to insure that everything was clear. The engine clutches were then thrown in and they were turned over slowly with the motors. All looked well. A signal was given to the electrician at the switch board to "speed her up."

Slowly the lubricating oil built up the required pressure and the discharge pipes into the sight box on the side of the engine showed abundant supply to the piston heads. The circulating water pressure started to climb and was soon up to the required mark on the gage. The spray air pressure was slow in building up, but finally arrived at the proper mark. The oil supply was then opened and the cylinder try-cocks closed, and as the engines had run under the care of the Germans who had built them and studied their operation, so they ran then. There was not a hitch, nor had anything been forgotten. That day we charged batteries for four hours without stopping the engines, in order to be assured there would be enough power in the battery to turn the engines over the next time they were needed.

After the crew had demonstrated their ability to run the engines, all hands "turned to" to provide the necessities of life and what few comforts we could gather. The subs up the "Trot" were ransacked for cooking utensils. We found plenty; terribly dirty and rusty. These we took, and after cleaning them and forgetting the condition in which they were found, the food prepared in them tasted very good. Plates, knives, forks and spoons, and the thousand and one things needed in the preparation and serving of food were purchased in London. Blankets, mattresses, pillows, life belts, sheets, etc., etc., were obtained from the Naval Depot, London. The Red Cross, always on the job when needed, provided us with woolen goods, pajamas, underwear, candy, chocolate, cigarettes, etc.

Fuel, lubricating oil, provisions and water were taken from the U. S. S. *Bushnell* and the *UB-88* was ready.

April 4 was the date set for sailing.

IV. The Trans-Atlantic Cruise

Promptly at the hour set, the *UC-97* cast off from alongside and headed down the bay, quickly followed by the *UB-141*, the *UB-88* and the *U-117*. The U. S. S. *Bushnell* brought up the rear.

The weather was hazy but not bad enough to make navigation difficult. The dim outline of the low shores could be seen through the misty clouds that hung floating over the surface of the water. As we passed the entrance of the harbor a gentle ground swell raised and lowered the bow of the boat and brought the

realization that we were again at sea. A gentle breeze blowing from the south, cleared away the North Sea haze. Each boat swung into formation with the *Bushnell* as guide. Speed was set by the division commander at eleven knots, later reduced to ten and a half and ten. In a few hours the white chalk cliffs of Dover were on our starboard hand; and later, to port, one could see the distant shores of France while between lay the waters of the North Sea and the Straits of Dover, where only a few months before the *UB-88* had cruised under the German Flag. That night the officers and crew slept a sleep of rest and satisfaction, knowing that the hard work of preparation had been rewarded.

In the morning we were out of sight of land and heading to the Southward bound for Ponta Delgada. The weather continued calm until the fourth day out, when a storm blew up from the West. It came on a rising barometer, however, and soon blew itself out. Two boats had engine trouble which delayed our passage. The repairs, which were only minor, were made aboard the boats. The engines of the *UB-88* ran perfectly. On the morning of the seventh day out, Serra da Agoa de Poa, on the Island of San Miguel, appeared on the horizon. A signal from the division commander: "Make the best of your way to Ponta Delgada," started a race between the *UB-88* and the *U-117* in which the *UB-88* suffered defeat by the much larger boat. We moored alongside the *Bushnell* in Ponta Delgada harbor on the afternoon of April 11. Portuguese civil and military officials flocked aboard to see the boats, one of which, a year previous had shelled the city. Bumboats loaded with laces, basket ware, silks and other articles for sale, came alongside, but found few customers. High prices had even found their way to the Azores.

A few repairs were made to the engines, provisions and water were taken on board, and on April 13 we set out across the Atlantic, bound for New York. Again the weather was beautiful. The sea was calm and the air clear. The white, blue and pink painted houses backed against the green of the mountain sides of San Miguel made a picture, never to be forgotten. The island soon disappeared over the horizon, however, and we were on the Atlantic heading to the South of West to reach the thirty-fifth parallel. The sea continued calm until the next morning when a wind sprang up from the northwest with the barometer

falling slowly. The waves built up with the wind and the seas broke over the starboard bow. Spray came continually over the bridge. All the hatches except the one in the conning tower were battened down. The boat rolled and pitched badly. This made it necessary for those men in the boat (except the ones on watch) to turn in their bunks or else be thrown from one side of the boat to the other with the roll and pitch. The air in the forward living quarters soon became bad. The blowers to those compartments were started but the amount of air delivered was not of sufficient quantity to be of much value. The officers and men suffered as a result. It was a choice of staying below to breathe the foul air or coming up on deck to be drenched by the cold spray. Most of the crew preferred the former or else took turns in sleeping in the after battery compartments where the air was good; this compartment being between the engine room and the conning tower hatch, through which the air was taken for the engines. The forward torpedo room which was especially foul was dubbed the "Blue Room." I doubt if ever a place was more appropriately named. Nothing could be done, however, to alleviate the condition. The officers' quarters were quite as bad as the torpedo compartment, so all hands suffered equally. The seas increased in violence and by the evening of the second day a strong northwest gale was blowing. The rolling and pitching of the boat increased. At night it was difficult to maintain any semblance of formation. The lights of the other submarines would disappear behind the waves for minutes at a time. The after range light of the *Bushnell* was in constant sight but it was possible to take only an occasional look over the top of the bridge on account of spray. The waves breaking on the bow or against the conning tower threw sheets of water high in the air. This was picked up by the howling wind and dashed against the bridge and over it.

The care of the health of the crew became a problem. It was impossible to obtain any exercise. The interior of the boat was damp and cold and the air was foul. By the routine administration of simple remedies, however, the crew kept in fairly good physical condition.

The rough and stormy weather continued. The track chart which was kept pasted in the officers' quarters showed us our

daily noon position. The runs from noon to noon showed very little headway against the weather. The days stretched out and it seemed as if the trip would never be over but the spirit of the crew never laxed. Irritability and sullenness, which so often find their way into the personalities of men confined to inactivity and discomfort were in the case of the crew of the *UB-88*, unknown. The spirit of congeniality between the officers and amongst the members of the crew was remarkable. Hardships and discomforts were met with smiles and conquered with fortitude. On the eighth day out the fresh water was found to be contaminated by fuel oil, which rendered it undrinkable. The distilled water, which was intended to be used for watering the batteries, had to be taken for cooking and drinking. As there were only 150 gallons of distilled water aboard, it had to be rationed out.

The ninth day began with a red sky in the east and a slowly falling barometer and by noon we were driving into the teeth of a heavy gale. Snow started to fall which warmed the air a little, but this was soon followed by hail, and then rain, and the continuance of the howling wind accompanied by the rocking and pitching of the boat.

One of the other submarines had been having trouble with her engines, which had delayed the division considerably. The *U-117* asked and received permission to proceed to New York, and shortly afterward we saw her lights disappear through a rain squall ahead of us. We kept on with the *Bushnell* and the other two boats until the next morning when the problem of water began to look serious. Permission was asked to proceed to New York alone. This was granted and as the flag hoist was hauled down word was passed to the engine room to make four hundred turns (speed for twelve knots) on both engines. Two destroyers which had come out from New York to meet us appeared on the horizon and were soon alongside. Moving picture machines were turned on us. The officers and crews lined the decks to take a look at the German submarines. They stayed with us for about an hour then they hauled ahead and slowly disappeared, headed for New York. At our increased speed we soon left the rest of the division behind and as the dusk set in we found ourselves alone. Next morning the wind had abated considerably and the

weather was warmer. We had entered the Gulf Stream. It was pleasant to hear the low purr of the exhaust, instead of the intermittent roar caused by the stern being frequently submerged by the seas.

Our water supply from the distilled tanks was exhausted one day out from New York and back we had to go to the fuel oil. In order to keep the crew from drinking the oily water, black coffee was always ready to be served. This did very well but did not quench the thirst as much as was sometimes desired. It was better, however, than the discomforts of the nausea caused by oily water.

The time now passed quickly. As the sea was not as rough as previously, we opened the torpedo hatch for a short time to allow the foul air to escape. The crew came out on deck and stood in the lee of the conning tower or walked back and forth holding to the life lines. Everyone took a new lease on life, smiles shone on faces where before there had been looks of anxious waiting. Razors appeared and did their much needed duty.

About two thirty on the afternoon of April 25, the heights at Navesink were sighted on the port bow and course was set for Sandy Hook, where we arrived at four thirty. The boat was moored alongside the Army wharf. The officers and enlisted men came down from the fort to greet us, and to care for our wants. The men were taken to the barracks where they were given the use of the shower baths, moving picture show and best of all, dry bunks to sleep in.

After the men had all been cared for, the officers were taken to the officers' quarters at the fort. The luxuries we enjoyed; shower baths, shaves, change of clothes, a wonderful dinner, and then real beds to sleep in. About six thirty P. M. the *UB-148* was reported from the watch tower on the end of the Hook. Soon after she was moored alongside the *UB-88*. She having heard our request to the division commander, to proceed to New York, made a like request and had left the *UC-97* and the *Bushnell* about two hours after we had departed.

Next morning at five thirty the *Bushnell* and the *UC-97* passed Sandy Hook. About nine o'clock we received orders to proceed to Tompkinsville to await instructions there. We were then ordered to the Navy Yard, where we arrived about three o'clock

The *Bushnell,* which had been in the North River, arrived soon after. Upon our arrival at the Navy Yard we were met by Captain T. C. Hart, U. S. N. The plans for the future use of the boats were given to us. The *UC-97* was to make the trip to Chicago via the St. Lawrence River, exhibiting the boat at all ports; the *U-111* was detailed to the New England coast; the *UB-148* received the coast cities around New York; the *U-117* was ordered to Washington, and the *U-B88* was given the Atlantic coast south of Savannah, the Gulf coast, the Mississippi River to St. Louis, the cities on the Texan coast, then to the West coast of the United States, via the Panama Canal, as far north as Seattle, Wash. All cities were to be visited and after the completion of the cruise the boat was to be returned to the Submarine Base at San Pedro, Cal. Preparations for the cruise were to start immediately. The U. S. C. G. *Tuscarora* was detailed as a tender for the *UB-88.* All personal effects and the few stores we had were transferred from the *Bushnell* to that vessel.

During most of the stay in New York, the boat was on exhibition and working in the interests of the Liberty Loan. It was also here that two very able officers, who had done so much to make the cruise across the Atlantic a success were detached. Their loss was sorely felt. The commanding officer was ordered to Washington to confer with the Chief of Naval Operations relative to the intended cruise, and while there made out an itinerary as far as New Orleans, La.

V. The Exhibition Cruise

On May 5, the *UB-88,* accompanied by the U. S. C. G. *Tuscarora* as tender, sailed from New York for Savannah, Ga. Speed for the cruise was ten and a half knots. On May 7, we entered the Savannah River, but did not go into the city that night, finding it necessary to moor to a lumber dock a short distance down the river from Savannah. It was here that we were first introduced to the southern mosquito. The *Tuscarora* came to our rescue with nettings and from that time until we sailed from Galveston, Texas, on July 30, to Colon, C. Z., we were obliged to use this form of protection. Early the following morning we steamed up the river and moored to the Municipal Dock. The

problem of showing visitors through the boat was one that had to be worked out. We did not know just how anxious the people were to see the vessel, or how large the crowds would be. We were soon to be informed. The mayor of the city had been notified several days ahead of our intended visit and had been requested to give all publicity to the event. The result of his publicity was evident. The office forces in the buildings along the waterfront, all left their books and crowded to the windows; the dock employees, negroes handling cotton, stevedores unloading ships, ship builders, everyone, quit work and looked at us as we slowly moved up the river. Steamers, dredges and factories all gave the three blast salute. No sooner had we moored than thousands flocked to the dock to make a more complete examination of the vessel. Brows were placed fore and aft. Police officers were stationed at each brow to maintain order and to keep the crowds in line. One member of the crew was placed in each compartment to explain the different parts of the vessel to the visitors and to prevent parts of the vessel being carried away as souvenirs. Visitors were allowed everywhere except in the vicinity of the switch boards. As a matter of safety to them and to the boat, this part of the submarine was roped off. As the people would pass into each compartment the man stationed therein would point out the objects of particular interest and explain their uses. He would also answer any questions which were given him. Then by calling attention to something interesting in the next compartment the crowds were kept moving. The system worked admirably. It was found by actual count that an average of five thousand people a day could be shown through the boat in this way. The visitors after leaving the forward torpedo room were shown into the chief petty officers' quarters, then the officers' room, then to the central operating room, the pump room, the after battery room, the engine room and then through the engine room hatch to the deck where if they so desired, they could climb into the conning tower and look through the periscope.

On May 11, we sailed from Savannah for Jacksonville, Fla., arriving the following day. The cruise up the St. John's River was without incident. The crowds continued to come aboard at about the same rate as in Savannah. After our previous ex-

perience in handling the visitors there was less confusion. Everyone commented on the reception they had received and the thorough manner in which the boat had been explained to them.

Before starting on the cruise from New York, we had been warned that souvenir hunters would try to carry away parts of the equipment. In order to frustrate any attempt of the visitors to steal articles for souvenirs, the men in each compartment were especially instructed to watch everyone carefully and to report any attempt of theft to the officer on duty who had orders to turn over the offender to the civil authorities. Despite the fact that we took all the precautions possible and even went so far as to have placards posted in all the rooms requesting visitors to refrain from taking or touching any of the equipment, a few small articles began to disappear. The thefts were almost wholly confined to the larger cities. In small cities it was very rare that any articles were found missing.

On May 14, we sailed for Miami, Fla., arrived there on the morning of the 16th. The mayor, city council and the chamber of commerce met the vessels as they entered the channel which leads through the keys to the city. An enormous crowd was present to welcome the *UB-88*.

The *UB-88* and tender arrived in Key West on May 18, and moored just outside the navy yard. Our greatest number of visitors in this port came from the naval population. The majority of the inhabitants of leisure in this city take their seista during the hours we were open to visitors.

The commandant of the eighth naval district did everything to make our stay in this port a pleasant one. The U. S. C. G. *Tuscarora* had been having boiler trouble, so it was decided to leave her in Key West for repairs and take another tender from there or else make the next two ports alone. The commandant did not care to have us undergo this unnecessary hardship, so he detailed a mine sweeper for our use on the trip to Tampa and Pensacola.

With our new tender we sailed for Tampa on May 20, arriving on May 21, left there May 23, arrived Pensacola May 25.

On account of the number of people to be shown through the vessel, the visiting hours had to be changed. We had previously

been keeping the vessel open from nine in the morning until seven at night. This was changed from the above to eight in the morning to eight at night. In several ports visited, people were found who had come from ports we had already visited but who did not get a chance to see the vessel in their own cities. This led us to believe that our stops were not of sufficient duration, or that visiting hours did not coincide with the hours of leisure of the people. Saturdays, Sundays, and holidays were especially "good" days. In some cases the waiting line was half a mile long, the people standing two and three abreast. The patience shown in the presence of an almost intolerable heat may be a judge of the popularity of the *UB-88* on this cruise.

Our short trip of eighty-three miles from Pensacola to Mobile was completed in about eight hours. In running past the entrance to Mobile Bay the thoughts of all naturally went back to the days over fifty years ago when Admiral Farragut carried out and upheld the best traditions of the service and made more traditions to be followed by his successors in the navy.

UB-88 remained in Mobile for four days. The *Tuscarora* rejoined us here and on May 21 we sailed for New Orleans.

The vessels arrived off the South Channel Buoy about two o'clock in the morning. The pilot standing by to receive vessels did not know of our intended arrival, and informed us he could not imagine what kind of a craft we were sailing. He had thought that a vessel was foundering and had rushed the pilot boat alongside to give assistance. His surprise was great when he learned that he was piloting a German submarine, something he said, he never expected to do. Having previously informed the commandant of the district that we would arrive that morning, a berth was arranged for us. Soon after we were moored the visitors started to come aboard. The crowds continued as before. A pilot was arranged for here, to make the entire Mississippi River trip as far as St. Louis and return.

In every port visited the newspaper reporters were usually the first people allowed aboard. The history of the boat while she was in the hands of the Germans, and photographs of the vessel taken in previous ports were given the reporters. An interview regarding the cruise, past and future, was also given. Working

in this way with the newspaper men, a great deal of publicity was given the vessel. This brought us many visitors, and as this was the object of the cruise our ends were attained.

We sailed from New Orleans in the early morning of July 7, for Baton Rouge a distance of one hundred and twenty-one miles. For the first time we were privileged to see the Mississippi River levees. While on the low decks of the submarine or even on the bridge, it is quite impossible to see any of the landscape on account of the river being so much higher than the surrounding country. The continual building up of the levees has raised the entire river to a great height and as years go by and the river continues its deposits, this process of building higher and higher will probably continue. Behind the levee here and there can be seen the tops of houses or just the top of a church spire or the topmost branches of trees. On the levee the cattle graze and negro children by the thousands, with little or no clothing, play during the hot days unmindful of mosquitoes or the torrid sun. They waved to us a greeting as we passed, then scampered down the other side to call the rest of the family. They appeared and we counted them. We came to know that there is no race suicide amongst the colored population.

It was after dark when the two vessels arrived in Baton Rouge. Next morning we went alongside the dock and the routine of showing visitors through the vessel began again.

On June 9 we unmoored and sailed up the river for Natchez, arriving on June 10.

While cruising from port to port on the Mississippi, the knowledge of the pilot was a matter of great concern. All pilots will naturally tell a commanding officer that they are thoroughly familiar with the waters in which they work and of course they generally are. It was extremely dubious, however, whether one man could "know" the entire Mississippi River to such a degree of thoroughness that he felt no worry in piloting a vessel its entire length. To carry such a great amount of knowledge in his mind and keep up with the ever changing channel was, I believe, the work of a superman. Captain J—— W——, the pilot of the *UB-88*, was such a person. At only one place did we touch bottom and of that place he had warned us long before

we ever reached it. We slid over, however, and as we glided again into deep water, he remarked that we would not be bothered with that place coming down as the channel, or crossing as he called it, in about two weeks would be farther up the river and there would be plenty of water. As usual he was right.

We arrived in Natchez on June 10 and left on the 12th. The routine inspection of the boat by the populace continued.

From Natchez we went to Vicksburg; Lake Providence, La.; Greenville, Miss.; Helena, Ark.; and Memphis, Tenn. It was found upon arrival at Memphis that the water in the river was falling so rapidly (a foot a day), that further progress was out of the question. Having received permission to return to New Orleans we started back down the river, leaving Memphis, June 26. We stopped at Greenville, Miss., on the 27th and 28th and on the morning of the 29th continued our journey south, arriving in New Orleans, on July 1.

On the trip down the river a decided knock developed in the port tail shaft. This was due to the after strut bearings being worn away by the sand and grit of the river. It was so bad by the time the vessel reached New Orleans that docking was necessary. As the only dock in New Orleans, the floating dock, at the Navy Yard, was in use, it was necessary to wait two weeks before it became available. The *UB-88* went into dock there on July 14. Upon examination it was found necessary to renew both strut bearings. These jobs were completed on July 22 and the vessel was undocked the same day. While in New Orleans the U. S. C. G. *Tuscarora* was detached from the command and the U. S. S. *Bittern* was ordered as tender. On July 23 we sailed for Galveston, Tex., arriving there on the 24th, about eleven P. M. The vessels remained in Galveston for three days, and on the morning of July 27, sailed up the Ship Channel to Houston, Tex., arriving the same day. It was here the Chamber of Commerce presented the commanding officer with a miniature bale of cotton to be taken via the Panama Canal to Los Angeles, Cal., and there to be presented to Miss Mary Pickford. The presentation was carried out with all due ceremony. Moving pictures were taken, still pictures were snapped. Upon the arrival of the boat in Los Angeles harbor, a similar scene was enacted. These combined depicted the reception and delivery

of the first bale of cotton to be taken from the east to the west via the Panama Canal.

On July 30 we sailed from Houston bound for Colon, C. Z. Bad weather was experienced during the entire last half of the trip. From the indications of the barometer and the shifting of the wind we were on the outskirts of a West Indian storm. Two hundred miles out of Colon a lubricating pipe to number one cylinder, starboard engine carried away, putting that engine out of commission. It was impossible to repair this at sea. In order to save time a tow line was taken from the U. S. S. *Bittern* and on the following day we entered Colon harbor. The two vessels moored at the Submarine Base, Coco Solo. Repairs were made and stores taken aboard. Saturday and Sunday the boat was open for inspection by the people of Cristobal and Colon. On August 12 we sailed through the Panama Canal for Balboa, arriving there the same day. We remained in Balboa for two days to give the canal, army and naval officials and civilian employees an opportunity to visit the submarine. We also had the pleasure of entertaining the ex-president of Peru, the vice-president of Panama and many Panamanian officials.

We sailed from Balboa on August 14, arriving in Corinto, Nicaragua, on the 17th. Upon receipt of news that several cases of yellow fever had been reported from the interior we sailed the following morning for Acapulco, Mex., arriving there on the 21st. Just before entering the harbor it was found that the starboard engine had become "salted." After mooring alongside the tender a thorough examination was made of the lubricating system. It was found that all the piston heads had been completely chocked up with salt. Salt water had found its way, in some unknown manner, into the lubricating oil. From first observation it was thought that the entire engine would have to be broken down to remove the salt from the piston heads. This would have taken at least a month. So that plan was abandoned. Different experiments were tried on this salt and carbon crustation with the idea of finding some agent to dissolve it. Gasoline, kerosene, alcohol, hot water and steam were tried. Steam seemed to answer our purpose to the best advantage, so we adopted this method for the solution of the trouble. The delivery side of the lubricating system was broken down between the pump and the

piston heads. Steam at 100 pounds pressure was connected up to the discharge side of the heads and allowed to remain until the salt was dissolved. In the case of three of the cylinders the steam broke through almost immediately, showing that the crustations in these pistons were not bad. In the other three, however, it was necessary to keep the pressure on for several hours before there was any sign of the steam coming through. Finally a small water leak was described in each supply pipe and then the passage became large until finally the steam rushed through, carrying with it large amounts of salt and carbon. An almost fatal condition was easily remedied by a few simple experiments, and we were again ready to sail. On the 23d we "upped anchor" and proceeded to sea, bound for Magdalena Bay. Here another delay was encountered by the U. S. S. *Bittern* losing a large percentage of her fresh water so that it was necessary to put into Manzanillo, on August 23, to replenish her tanks. We sailed the same day for San Diego, Cal., arriving on the 29th. The weather during the entire trip until the morning of our arrival, was intensely foggy. Upon our arrival in San Diego it was learned that we had been reported missing by the newspapers. This caused a great deal of concern outside of naval circles. The delay in making repairs and the rewatering of the U. S. S. *Bittern* caused us to arrive in San Diego three days behind schedule. This fact furnished the papers a subject for sensationalism of which they readily took advantage.

From San Diego we sailed north making stops at San Pedro, Santa Barbara, Monterey, San Francisco, Mare Island Navy Yard, Astoria, Ore., Portland, Ore., Seattle, Wash., Tacoma, Bremerton Navy Yard, Bellingham and then back to San Pedro, stopping for a few days in San Francisco.

The trip on the west coast was without incident except for the difficulties encountered in navigation, due to heavy fogs.

Upon the arrival of the *UB-88* in San Pedro on November 7, our cruise was over. The work which had been assigned to the officers and crew of this little vessel had been completed. A successful cruise it was. During the trip from Harwich, England, to the final arrival in San Pedro, we had "steamed" 15,361 miles, and during that cruise we had shown the vessel to over 400,000 enthusiastic visitors.

BUILDING A WAR SHIP IN THE SOUTHERN CONFEDERACY

By Rear Admiral W. M. Parks, U. S. Navy, Retired

THE following particulars have been gathered from "Official Records of the Union and Confederate Navies in the War of the Rebellion" recently published by the Navy Department.

A few months after the beginning of the Civil War, Mr. Nelson Tift, a resident of Georgia, reflecting on the scarcity in the South of the materials of ship building as carried on at that time, and on the lack of skilled workmen in that trade, conceived the idea of utilizing for ships such material and such labor as were abundant in that part of the country. For material he would use pine wood from the vast pine forests of the South, and his design of ship was such that house carpenters and common laborers could do the greater part of the work.

Mr. Tift's novel design for a ship provided for the use of straight timbers throughout; there were to be no curves and no framing. Starting from the bottom each course of timbers was to be laid, calked and painted, before the next course was laid on. The bottom or floor and the decks were to be flat. One part of the hull was to be rectangular in shape, and the two ends, forming the bow and the stern, were alike, and triangular in horizontal section. For a war ship which was the main purpose of the design, the hull was to be topped by an iron-plated superstructure with sloping sides, thirty-six degrees, changed later to thirty degrees, and pierced for guns, such as was at about that very time being built upon the razed hull of the frigate *Merrimac* at the Norfolk Navy Yard. It will be seen that in several particulars this design was similar to Mr. Ford's *Eagle* Boat design of many years later.

Mr. Tift was neither a shipbuilder nor an engineer; he had been merchant, railroad man, legislator and man of affairs. He was a native of Connecticut which may account for his inventive

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genius, but which was to count heavily against him later on, notwithstanding the fact that he had been a resident of Georgia for thirty years. Associated with him in presenting his design to the authorities, was his brother, Mr. Asa Tift, likewise without shipbuilding or engineering experience, but like his brother for many years a resident of the South.

The two brothers provided themselves with letters of introduction to leading men in the Government of the Southern Confederacy, just then recently established at Richmond, Va. They took their model to the Secretary of the Navy, Mr. S. R. Mallory. They were kindly received by the Secretary, and a board of naval officers was called together to examine and pass judgment upon the novel design.

Strange as it may seem the Georgia merchant's design of a warship was enthusiastically approved by the naval board. Contrast this with Ericsson's experience, at about that time, when he laid the *Monitor's* design before the naval board on the other side of the Potomac River. And Ericsson was an engineer and a shipbuilder of note. Apparently it was not entirely the conservative element of the old Navy that threw in its lot with the seceded states.

Acting upon the advice of his naval board, Mr. Mallory immediately authorized the Tift brothers to build the most powerful warship possible, according to their design, and designated New Orleans as the place where the vessel was to be built. This was done in order that the new ship might first be used to break the blockade of the Mississippi River which was already making its deadly power felt in the Southern Confederacy. After that, if dreams were to come true, the new ship was to go up the Atlantic coast and drive the enemy from before every port of the Confederacy.

The plans approved by the Naval Secretary and by the naval board called for a vessel about 260 feet long, fifty-eight feet beam and fifteen feet deep. The designed draft was to be fourteen feet. The vertical sides of the rectangular shaped part of the hull were to be two feet thick; same thickness for the stern section. The bow section was to have sides three feet thick, in order to strengthen that part of the hull for ramming. The speed decided upon, 14 knots, was remarkable for that time. An-

other innovation, thought by some to be original with our own modern Navy, was the division of the motive power among three engines, driving three screw propellers. The engines were single cylinder, vertical inverted, non-condensing, diameter of cylinders thirty-six inches, and stroke of all thirty inches. Steam of high pressure was to be supplied by sixteen horizontal, cylindrical, two-flue boilers, arranged in two sets, each set having a double furnace built of brick work. Boilers were forty-two inches diameter and thirty feet long. Apparently there was to be one smoke pipe. There was of course a "Doctor" as the independent boiler feed pump was called but apparently no other auxiliaries. Simplicity prevailed in the engine rooms of those days.

This ship must have had a displacement in the neighborhood of 4,000 tons, and the indicated horsepower for the designed speed of 14 knots would have been not far from 2,000. These figures of displacement, speed, and indicated horsepower were probably not exceeded at that time by any warship afloat. About 1,000 tons of iron plates were to be used on the sloping sides and the top of the superstructures, an unusually large part of the displacement to be allotted to armor protection. The battery was to be twenty of the heaviest guns that could be found. Undoubtedly this vessel would have been invulnerable to any guns that could have been brought against her, and no vessel afloat at that time could have withstood the impact of her formidable ram. No wonder enthusiastic naval officers of the Confederacy spoke of this ship as the most wonderful warship in the world! And she probably would have been that, at any rate for use in home waters, had she been completed.

The Tift brothers desired no money compensation for their design. It appears that glory was all that they were after. They asked for no contract and none was made with them. The Secretary of the Navy designated them "Agents of the Navy Department"; and as such they agreed to superintend the building of the vessel on the approved plans, without compensation, except for very modest traveling expenses incurred by them in connection with the work. The pay rolls and the bills of the subcontractors were certified for payment by the Tifts, whereupon a naval paymaster, detailed for the purpose, paid out the money. It is a pleasure to record that the Secretary's confidence in the

honesty and patriotism of the brothers was not misplaced. They seem to have done everything humanly possible to make the undertaking a success.

The Navy Department had agreed to detail a naval constructor and a naval engineer to superintend the work in their respective departments. This was done in the case of the naval constructor; but although the names of several naval engineers appear as connected with the work for longer or shorter periods no one of them seems to have been detailed to devote his entire time to the work throughout its continuance, and this was a serious error, because it was in the engineering department that the delays occurred that brought failure to the enterprise. The Navy Department was to furnish the battery; and also the necessary anchors and chains, etc.

In September, 1861, two weeks after receiving final instructions from the Navy Department, the brothers Tift arrived in New Orleans and at once began preparations to build their ship. They selected a site for the work on the river bank just above New Orleans. There they built a saw mill and a blacksmith shop and the foundation for the ship to rest upon. With this modest outfit completed the first timber, not the keel, was laid on October 14, 1861. Three months was the time set in which to finish the ship; and in spite of unlooked-for delays in getting timber the hull came very near to being finished in that time. And this was certainly a remarkable feat, since on the date when the first timber was laid much of the lumber afterwards worked into the vessel was standing in the forest.

Of course the design of the ship, without curves and with no framing, helped greatly in making this record, and there were also constant reminders from the Navy Department of the urgent need for the vessel, and telegrams came thick and fast to spare no money and no effort to complete the task. It is apparent that the authorities at Richmond were aware of the danger to the city of New Orleans from the Federal fleets, one above the city and another below, and they also recognized the fact that the only hope for the city was in having a force afloat more powerful than any the enemy could bring into action. This new and powerful vessel would have supplied that force, had she been completed and armed as designed.

But from the first the Tifts do not seem ever to have received the cordial co-operation of the local machinists and shipbuilders that the importance of their undertaking merited. The machine shop people particularly were not eager to give priority to the newcomer's work over work they themselves already had in hand for the Government; and there was no one present with authority to enforce that priority. Not being bound by a fixed price contract the Tifts could pay whatever was demanded for anything they needed; and while it does not appear that they abused this power it nevertheless did not add to their popularity in the local field. The brothers were also unfortunate in their first choice of a civilian engineer, and there was delay in getting out detail plans for the machinery. Lumber for the hull became scarce and difficult to find. There were strikes for higher pay. Although these demands of labor were quickly met, precious time was lost. Service in the army, it seems, took some of the best workmen and time was consumed in getting these men released. But all the time work was pressed day and night, and the brothers certainly did not spare themselves.

The great difficulty was the machinery. No second-hand engines suitable for the purpose could be found in the Confederacy, and there was no plant outside the Norfolk Navy Yard—soon lost to the South and busy just then with the ironclad *Virginia* —that could build both the engines and the necessary shafting. Finally, and by the promise of a bonus, a New Orleans firm finished the main engines, without the shafting, and also the boilers; and these were installed in the ship.

But the propeller shafts nine inches in diameter, presented the most serious difficulty, as had been foreseen from the first. The Tifts literally combed the country to find three used shafts that might be made to do, but in vain. Wrought iron was the material it had been decided to use; it was before the day of steel. The river steamboats of that day used cast iron for their relatively short shafts, but that material would not do for these long propeller shafts, although its use was at one time seriously considered. After some delay a New Orleans firm that had a contract to make some wrought iron guns for the Government consented to change their furnaces, cranes, etc., to handle the longer pieces forming these shafts. When all was ready a competent hammer

man could not be found and there was delay until a competent man could be sent by the Navy Department from the Tredegar Iron Works in Richmond. One shaft was forged—a wing one—in two sections; one section eight feet long, the other thirty-two feet long. These pieces were sent to another shop to be machined; then the second wing shaft was finished in the same way.

In the meantime, and to hurry on the work, the Navy Department offered to furnish the center shaft from the Tredegar Iron Works. But even there, in a plant that was the best equipped in the South for heavy work, it was not possible at that time to forge this shaft. By great good luck a used shaft was found that could be added to and drawn down, and so made to do. But even so it took weeks, working day and night, to complete the shaft, and it arrived at New Orleans too late to be put in place before launching. It was hurried on board and went down with the ship.

Then came the question of the screw propellers, three of them, each eleven feet in diameter; no other dimensions given. No moulder in New Orleans knew how to make a mould for a screw propeller, and apparently there was no engineer there to show the moulders how to do it. A screw propeller was something of a rarity on the western rivers in those days. As was done in the case of a hammer man appeal was made to Richmond and a loam moulder was sent who did the work. Apparently this loam moulder did not strike for higher wages. I am glad to record his name, McPherson, no initials given. A Scotchman probably, as there were a number of them working at various places in the Confederacy, attracted by the comparatively high wages paid there for skilled mechanics.

By now it was early spring, five months after the first timber had been laid, and the ship was not yet ready for launching. The feeling of security that had prevailed in the city began to give way to a feeling of nervous apprehension. A citizens' committee of safety was formed; this committee was of some help to the Tifts because they were able to commandeer workmen from the various shops in the city and send them to work on the new warship. But it was too late; and so the question of launching the vessel and towing her to a place of safety came up. The Tifts protested against launching at that time claiming that the

vessel could be more quickly finished where she was, which was probably true. But they sadly underestimated the time to finish, naming two weeks, when the best expert opinion obtainable was six weeks. The matter was put up to the commandant of the naval station, but he declined at first, to interfere. In a short time this decision of the commandant was reversed, and immediate launching was urged by him. There was much hesitation on the part of the naval officers present to take decisive action. The commandant was new to his duties; in fact there had been several commandants in command within a few months, and no one of them seems to have been certain of the extent of his authority over the Tifts or over the ship.

The prospective commanding officer of the vessel, Captain Sinclair, had recently been ordered by the Navy Department: but apparently he was not to have authority over the vessel until she was finished and turned over to the Government. There is no doubt, however, that he helped materially to hasten work on the vessel, advising the Tifts in all matters where his experience as a seagoing officer was of use. He seems to have had with him some of the officers detailed to the ship, and these were busy drilling the crew on shore and in other ways getting things ready for speedily commissioning the ship when she should be pronounced ready.

The Tifts in the meantime pressed the work with energy but still delayed the launching, trusting too much, it now appears, to their own inaccurate estimate of time required to finish; that estimate always being contingent upon holding the ship where she was. At last, however, urged by the committee of safety, and by the naval officers present they agreed to launch. The Navy Department telegraphed permission and at the same time announced the name of the ship, *Mississippi*.

The first attempt at launching was a failure, due it was said to a locust-wood pin driven through the ship's bottom and into the foundation upon which the vessel rested. When this had been removed three powerful steamboats pulled the ship into the waters of the great river so soon to be her grave. Apparently there were no ceremonies, no cheering crowds, no whistles blowing and no speech making. The date was April 19, 1862, and six days later the enemy's fleet was before the city, and the

Mississippi was still a helpless hulk, without battery and without motive power, and with but little of her armor plating in place.

Then at last decisive action was taken. The commandant ordered Captain Sinclair and his officers to board the ship and try to have her towed to a place of safety. Apparently no particular place was named; it was merely get her away from the vicinity of New Orleans. Failing in that the orders were to destroy her. Two river steamboats took the vessel in tow but they were not able to stem the swift current of the river. Frantic efforts were made to get additional steamers, but by that time many of these had escaped up the river, and those that remained had been deserted by their crews. In the meantime the *Mississippi*, despite the efforts of the two towing steamboats, was slowly drifting toward Farragut's approaching fleet. Seeing that nothing more could be done Captain Sinclair gave the order to apply the torch. And so passed forever the one chance the Confederacy had to regain control of the Mississippi River.

The two towing steamboats fled up the river, carrying with them the naval officers who had been on duty in New Orleans, and such stores and archives as could be hastily gathered together. From the deck of one of these boats the Tift brothers saw the last of their cherished design. Both were heart-broken, and one of them wept bitterly. Upon arrival at Vicksburg what must have been their surprise to find that they had been denounced from New Orleans as traitors? An angry crowd met the boat and there was talk of hanging traitors. The provost marshal put them under arrest. Fortunately for the Tifts the Paymaster, Mr. Senac, who had been detailed by the Navy Department to pay their bills for work on the *Mississippi* was on board, and that officer strongly protested against the arrest, calling it an outrage, and demanding to know upon what authority the provost marshal was acting. Then it came out that the Tifts were accused from New Orleans of burning the *Mississippi*. A scape goat was demanded, and here undoubtedly the fact of their Northern birth counted against them; such is the usual logic of an angry mob.

The military governor at Vicksburg was appealed to by Paymaster Senac and that official consented to hear what the naval officers who knew the Tifts had to say in the matter. These

soon made it clear that the brothers had nothing to do with the burning of the *Mississippi*. And so they were released from arrest, but it seems rather reluctantly, for it was argued that further accusations might come from New Orleans; but apparently none did. This unfortunate experience with the *Mississippi* did not alienate their friend the Naval Secretary nor discourage the Tifts from their chosen work, for they were soon afterwards given a contract to convert the blockade runner *Fingal* at Savannah, into an ironclad, the *Atlanta*, captured later in the war by the monitors *Weehawken* and *Nahant*.

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COMMON SENSE TRAINING WITH THE SERVICE PISTOL

By Commander G. M. Baum, U. S. Navy

WE ARE all more or less familiar with, and some more expert than others, in firing the service pistol on the target range, or at a stationary object. Many chapters have been written to demonstrate the advisability of squeezing the trigger instead of pulling it. More chapters have been written to show the proper firing position, the proper grip on the handle, the correct alignment of the arm and pistol barrel, and many more hints designed to insure hitting the *bull's-eye*. How many of us, however, know how to *use* the service pistol effectively either offensively or defensively in an emergency?

Bull's-eye shooting on the target range is very pretty and requires a great deal of skill and steadiness of the hand and arm to make a good score, but all of the skill in the world at bull's-eye shooting is of no value when the expert pistol shot is confronted with a sawed-off shotgun loaded with buckshot in the hands of a determined novice, unless the said expert pistol shot is accurate and quicker with his pistol in the emergency than his less skilled adversary. All that the novice with the sawed-off shotgun need to do, is, point the shotgun in the general direction of *his* adversary, pull the trigger whether by a squeeze or pull, and be reasonably sure that one of the buckshots at least will strike its objective. Successfully to combat his shotgun-armed adversary, the expert pistol shot, to carry out his teachings on the target range, must take the proper standing, sitting or kneeling position, see that his forearm and pistol barrel are in proper alignment, take a deep breath, close one eye, get the sights properly aligned on his adversary's head, chest, or abdomen, whichever he deems the most vulnerable, slowly squeeze his hand so as not to spoil his aim, and have the pistol go off, not knowing the exact moment at which the hammer will fall. Is there any doubt as to which will have the best chance of success in the event of such an

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encounter? And yet, that is exactly the way that we teach pistol shooting to prepare for an emergency.

The pistol, any pistol, is essentially a weapon of opportunity for use in an emergency. It is the weapon with which officers, chief petty officers and some petty officers are required to be armed in landing force operations. It is the weapon with which sentries, or orderlies on dangerous posts or missions are generally armed. It is the most generally carried weapon in the Navy and at the same time, the one in whose *use* the least actual instruction or training is given. I do not advocate copying the motions of such film experts as William S. Hart, Tom Mix, or Douglas Fairbanks, although many valuable lessons may be drawn from the skill of these men. I do advocate proper training in the USE of the service pistol along lines which will enable a man thus armed to use it effectively in an emergency.

Expertness and great accuracy with a pistol can be attained only through hard practice, but reasonable effectiveness can be attained within a short space of time by employing common sense methods and requiring a more moderate degree of accuracy. The most probable target against which the pistol will be used must unfortunately be the body of a human adversary. Therefore the training with the pistol should be at a target representing a human figure. As we engage in target practice with our big guns at a target representing the silhouette of a battleship, so ought we to engage in practice with the service pistol at a target representing the silhouette of a man. An enemy cannot, in an emergency, be expected to wear a bull's-eye as a point of aim, to make hitting him in a vital part more easy.

Let us examine into some first principles governing the pointing of the pistol with reasonable accuracy. The average person, when called upon to point at an object, can do so with remarkable accuracy. If you are skeptical, try pointing with your finger, pencil or stick at some object within easy pistol range, such as the doorknob, the inkwell on your desk, a picture on the wall or the center of an open window. Then hold your hand steady and aim along your finger, pencil or stick to see how near you have come to your point of aim. If your first attempt is awkward or unsatisfactory, repeat the experiment several times and note the improved accuracy of your efforts. If these experiments are

uninteresting, try the same ones with an UNLOADED pistol. Try picking up the pistol from the table quickly and pointing at an object, and then sight along the sights to see how near they are to alignment on the objective. Or draw the pistol quickly from the holster in carrying out the same experiment. I venture to predict that the alignment of the pistol will be within reasonable accuracy of the objective. Bear in mind that the usual pistol range in an emergency will be comparatively short, hardly more than fifty yards, and generally not more than ten yards, and that the shot that hits first, is the shot that counts most.

Such training can easily be given on board ship, or anywhere on shore, even though a target range is not available. The test of the efficiency of the training must eventually be made at a pistol range, which may be almost anywhere where there is no danger of injury to lives and property. An elaborate pistol range is not essential to training for a reasonable degree of accuracy. The most important details to be taught are familiarity with the weapon and speed in handling it. Reasonable accuracy after acquiring these details comes naturally.

While on the Asiatic Station a short time ago, it was my good fortune to become acquainted with the instructor in musketry of the Shanghai police force, and to have the opportunity to inspect and fire on the police pistol range. A description of one of the courses of instruction might be of interest. I might add that the instructor is an enthusiastic advocate of the service pistol now in use in the United States Navy and considers it the best all-around pistol manufactured. And he is an Englishman.

The most interesting of the courses consists of twenty rounds divided into six strings as follows: three rounds at a stationary target; three rounds at a swinging target; five rounds at a bull's-eye target; three rounds at a running target, single shots; three rounds at a running target, rapid fire; three rounds at varied targets.

In the first string the target is the outline of a man standing. The target is marked by lines enclosing the vital parts of the body wherein a shot will either kill or definitely disable. All hits within this area count five. The next area encloses the parts of the body within which a hit will disable but not necessarily kill, such as the arms, legs or feet. All hits within this area count

four. The next and last area encloses such parts of the body as will neither kill nor disable a person, such as flesh wounds not sufficiently serious to prevent inflicting return injury. All hits within this area count three. With the target twenty paces distant, the shooter must stand with the loaded pistol in his hand at his side. At the command "Fire," he raises the pistol without taking aim and fires at the target. A few seconds only are allowed per shot. This is repeated until three shots are fired. Then the target is examined and hits counted.

In the second string, the target represents the head and shoulders of a man. The lines for scoring follow the scheme of those in the first target. This target is rigged to be swung out from behind a wall on hinges and then be withdrawn after a few seconds. The shooter stands about twenty paces from the target with the loaded but uncocked pistol in his hand at his side. At the word "Fire" the target swings out from behind the wall and is left in view about three seconds. The shooter must cock, raise his pistol, and fire, during the time the target is in view. He is allowed three single shots after which the target is examined and the hits counted.

The third string of five shots permit of deliberate aiming and shooting, and represent firing from the corner of a house, from behind a tree, or from inside of a window casing where it is possible to point the barrel of the pistol around the edge of the obstruction behind which one is hiding, and take aim, exposing to view only the eye and a small section of the head plus such parts of the hands as are grasping the handle of the pistol. This leaves a very small target for the adversary to fire at, at the same time permitting one to take deliberate aim at the adversary. Since the person firing is well protected from injury and view, there is no time limit for the firing of the five shots of this string. The target is about the same size and with the same circles as the pistol target used at all target ranges. The distance from the target is about twenty paces. A hit in the bull's-eye counts five, four in the next ring, three and so on. In this string the shooter takes his position behind a post and may rest his wrist on the edge to steady his hand.

The next string of three shots is fired singly at a figure representing a running target. The Shanghai police call this the

"Pootung Target" because, if the first shot does not hit, the man fired at will be in Pootung, across the Whangpoo River, before the next shot can be fired. The target is about twenty paces from the firing point. It represents the figure of a man and is marked with lines, hits within vital or killing sectors of the body counting five, hits within disabling parts of the body counting four, and flesh wounds three. There are no twos. The shooter takes his position at the firing point with uncocked pistol in his holster. At the word "fire," the target starts from behind a wall and across an opening about ten feet in extent, at a speed of a man running quite rapidly. During the time that the target is in sight, running across the opening, after the order "fire," the shooter must draw, load and fire his pistol. This is repeated three times after which the hits are counted.

The next string of three shots is fired at the same target under the same condition except that during the time that the target is in view running across the space, three shots must be fired.

The last string of three rounds are fired under conditions representing the raid of a brothel. This string is fired inside of a bombproof to prevent wild shots from injuring anyone. The shooter takes his position outside of a door which leads into a dark passageway. Upon opening the door, he is permitted to draw and load his pistol. The passageway is dark and littered with chairs, boxes or short stairs, in fact, many things to cause extreme care in walking. At the end of the passage is another door leading into a dimly lighted room. The shooter must push open this door and step into the room. Immediately he steps into the room he must be prepared to shoot at whatever target he sees representing a human being. As soon as the shooter clears the threshold, fire crackers, confetti, sticks or other objects are thrown at him, some one yells into his ear, pistols are fired behind him and everything possible is done to shake his nerve and disconcert him. A target representing the head and shoulders of a man swings out from behind a wall remaining in sight only momentarily, a Pootung target slides across the end of the room, a head appears above the edge of a table, or a dummy is dropped into the room from above to represent a man springing down. Only three targets are shown and the shooter is permitted only one shot at each target. These targets are marked as previously described in five, four, and three sectors for scoring hits.

The details of this course may not be described exactly since there are no written instructions or descriptions of the course issued, and the course is frequently varied to introduce new conditions. I am describing it from my recollection of the time that I fired over it. The course may be varied at will to train individuals for any particular work that is to be undertaken and may be made to fit conditions that may be encountered in the service.

The course described in the foregoing is only a very small part of the training undergone by members of the Shanghai police force, most of whom are Europeans. Other features of the training cover shooting from the pocket or cape that is being worn; drawing a pistol from a drawer of a table and firing at a target; firing at two widely separated targets with a pistol in each hand; turning quickly, drawing the pistol and firing at a target, etc. In fact, an effort is made to train the man in situations requiring the most varied "use" of the pistol. No time is spent in bull's-eye shooting for training purposes, but bull's-eye targets are available at the range for practice of those who desire to partake of this more refined phase of pistol shooting.

Generally, the pistol is carried because of its convenience, and because it is designed for emergency offensive and defensive use. Where greater accuracy and less freedom from encumbering equipment are required, the rifle is by far the better weapon to carry. The range of the pistol is necessarily short and the sight has not the finer adjustments that are necessary in a rifle for more accurate shooting. However, effective training in the use of the pistol is a much simpler problem than training in the use of the rifle because it can be made much more interesting and realistic. The range can be more conveniently located because of the lower penetrating power of the average pistol, and besides, there is less danger from wild shots, especially if the training is conducted in a well constructed bomb-proof.

It has been my experience that instruction in the use of the pistol is given very reluctantly in the Navy, preference being given to instruction in the use of the rifle. The reason for this is not clear. Such training as is possible with the rifle is most necessary to prepare the men for duty in landing force operations or other duty where they will be armed with the rifle. This,

however, is not a good reason why we should neglect the pistol. Glance casually over the armed sentries or orderlies on board ship and please note that practically all of them carry the pistol. The pistol thus worn may be merely a badge of authority, and if it is, a star or an arm band would answer the purpose quite as properly. If the pistol is worn to be used in an emergency, then the wearer should also have the training essential to the effective use of that weapon in an emergency that may arise at any instant.

Such a course of instruction and training as is described in the foregoing would be easy to devise, and the pistol training which is now either neglected or reluctantly given would be made interesting and very useful. To arm a man with a pistol without expecting him to use it when the emergency requires it, is silly. To arm a man with a pistol for use in an emergency, without first giving him training in its use, is decidedly unfair to the man.

I recall a story about the young man who had been challenged to fight a duel with one of the very best pistol shots in the country. One of his friends excitedly and sympathetically reminded the young man, "I have seen X— cut the stem of a wine glass with a single shot at twenty paces." The young man asked, "Was the wine glass shooting back at him?"

THE OFF-SHORE GULL

A Watch Officer's Discourse Forty-odd Years Ago

By Commodore E. B. Underwood, U. S. Navy, Retired

HALF a long lifetime ago I joined the *Pensacola*, flagship of the commander-in-chief of our naval forces in the Pacific. On joining her, I found as one of my fellow officers, an old friend—the third watch officer, Rodgers. He was an excellent practical seaman, his command of men was the envy of all the rest of us, he was full of jokes and stories—in short, a real addition to the mess. But he was a rough diamond—at least so we called him then. In these days, he would undoubtedly be called a "roughneck." His language was far from parliamentary, he used tobacco in both forms, and he was fond of strong waters, the greater their horsepower, the better to his liking. I remember that his favorite tipple was of Scotch extraction, put up in an earthenware vessel, in shape between a jug and a bottle, each vessel being stamped with the word "Jeroboam." He would take a second mate's nip of this fiery compound and never stir a hair. He was a free drinker, but he knew how to "space 'em," and I can truthfully say that during our two years of wardroom intimacy, I never saw him what is commonly termed "the worse for liquor."

At the time of which I write, Peru and Chile were at war, and the principal Peruvian cities were held by a Chilean army of occupation. In the present month (August, 1922), delegates from these two countries are in conference in Washington, trying to iron out some of the rough spots resulting from this war. For two years the *Pensacola* was kept south of Panama, a large share of that time being spent on observation duty in the harbor of Callao. At one time yellow fever broke out in the city of Callao, and we moved across the bay and anchored under the island of San Lorenzo, where we remained in quarantine for several weeks.

Those were trying times and about the only bright spot in the monotony and tedium of the day was the hour just after dinner,

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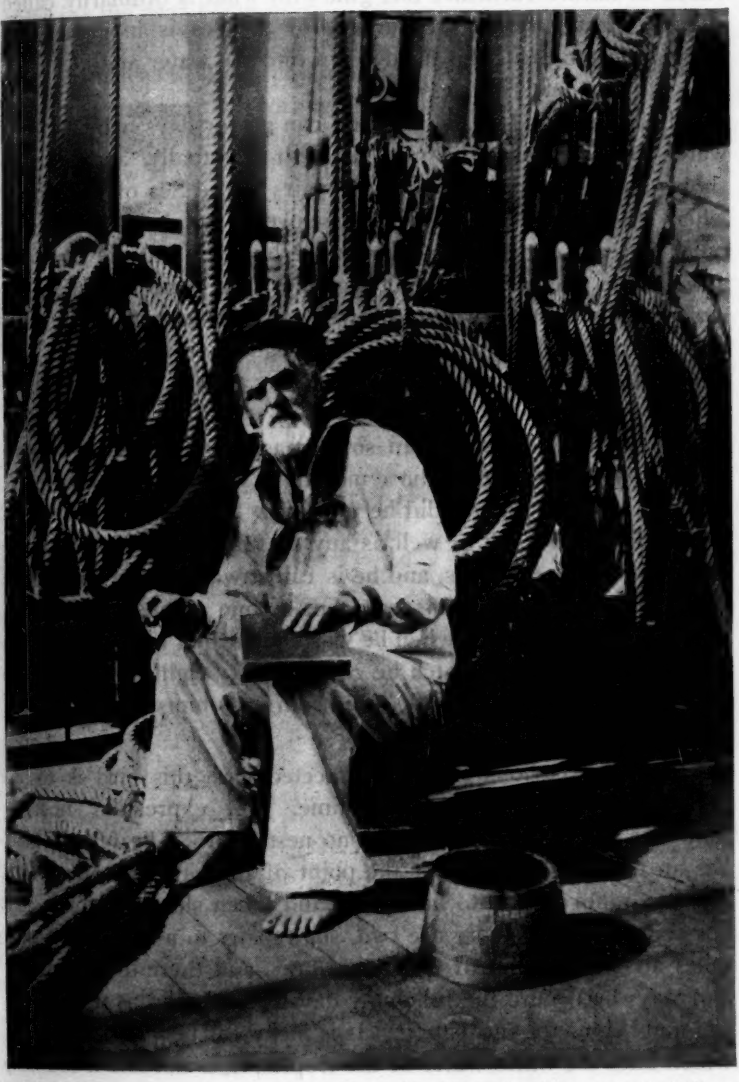
when the majority of our mess assembled on the port side of the quarter deck there to enjoy their nicotine, as well as to watch the twilight thicken into murk, and see the stars, at first only dimly visible, gradually intensify into the final glory of their brilliant radiance. Here jokes flashed and yarns circulated.

At one of these meetings, an unusually long silence was broken by Rodgers, who queried, "Did any of you fellows ever hear of the Off-Shore Gull? Some people call it 'The Bird Without a Country,' because during the whole course of its existence, from youth to hoary age, from egg to expiration, it never puts foot on land. You have, therefore, never seen it on shore, and if you have ever seen it at sea, you have probably not been able to identify it. Its habitat is the Atlantic Ocean, and principally the North Atlantic where it is found from the equator to a little north of the Horse Latitudes. It is never found inshore of the Gulf Stream, but may be met with in the Stream itself and to seaward of it, especially among those sizable islands of the Saragossa Sea, where the fish, crabs, and small parasites afford good browsing.

"An old-time friend of mine, Captain Cumber, told me that in their brief breeding season, these birds are to be found in the southern reaches of the Gulf Stream as thick as flies around a slaughter house. He even went the length of arguing that this particular gull gives the Gulf Stream its name!

"The full name of this Captain Cumber is Quincy Cumber and he comes from New Bedford. He is called by his intimates 'Q-Cumber.' A number of years ago I happened to be in Montevideo and found him there in command of the American brig *Ardent*. From him I learned most of what I am telling you about this gull. He took me on board his brig and showed me a stuffed specimen, the only one I have ever seen to identify, but he could not tell me whether it was a male or a female.

"It was about half the size of a loon or great northern diver, and its back reminded me of a cape pigeon, being of grayish tinge, thickly spotted with white; its breast and underparts were white; its tail was pure black, as was also its head, though directly on the top of the crown there was a white spot about as big as a dime; its legs and feet were pink, the latter being webbed; its bill was unusually long and ended in a blunt point. The strange thing about the bird was the fact that it had only one eye, which was



JOHN KING, QUARTER GUNNER, U. S. N., U. S. S. "MOHICAN," 1888
Who would vouch for the Off-Shore Gull!
(See frontispiece and footnote on page 1237)

placed in the end of the upper mandible. This thoughtful provision of nature furnishes this gull with what is ordinarily called a water-glass. When the surface of the sea is in great commotion, he can thrust his head down into the water and locate his prey without any trouble.

"He is the camel of the seas and can go for days without fresh water, but of course he must have it eventually, and here he shows his ingenuity. Each bird repairs to the Sea of Saragossa, where those unusual masses of seaweed are banked up, and quickly cleans out three or four of the bivalves that are generally attached to the weed in that region. This done he places the empty shells in rows where the weed is thickest and packs them with extra weed to insure their staying on an even keel. The frequent torrential rains of that region always keep his tanks full for him.

"This bird is smarter than some master mariners. It would go hard with him during those months of the year when tropical cyclones visit his habitat did he not know how to meet the situation. But he can tell as well as any seafaring man just how the center of the storm bears, and he is fully aware of the hauling of the wind even to so small an extent as one point. 'Q-Cumber' told me of one occasion when he was caught in a tropical cyclone, and in one afternoon watch he counted fifty-eight of these gulls all standing on practically the same course as himself, making for the safe semi-circle.

"The most curious feature connected with this bird is to be noticed in February at nesting time. The expression 'nesting time' is a misnomer, for there is no nest built. The female bird has an unerring instinct for the point of the Gulf Stream where the maximum heat is to be found, and when she is ready to lay her eggs, of which there are two, she repairs to a spot about 200 miles above the point of maximum heat, and there drops an egg and stays by it until the following day when she drops the second egg and begins the incubation. It is lucky for her that the shark, which likes the warm water of the tropics, does not like it too hot, for otherwise the Off-Shore Gull would in a few years probably become extinct. The great heat of the Stream, re-inforced by the caloric of the bird's body, produces a forced incubation, and in about five days the young are out of the shell. Their growth

after hatching is as rapid as it was before, and in a week they are able to shift for themselves, and they part from their mother, her work for the year being over."

After a pause, in which nobody appeared to be able to do the subject justice, Rodgers continued, "I have never had a chance to go into this matter thoroughly, so if any of you should come across the scientific name of this gull in any work on ornithology, I wish you would pass it along to me. As I have the midwatch ahead of me, I must turn in. But first I am going to have a night cap, so if any of you fellows want to take a pull at the halliards, come below with me and I will give you something to 'cut the flame out of your throats and warm up the cockles of your hearts.'"

As these were pre-prohibition days, there was but one acceptance of this thoughtful offer.

DISCUSSION

The Secretary and Treasurer,
The Naval Institute.

Dear Sir:

I beg to enclose, as a *discussion* of my article on the Navy's Paper Work in No. 241 of the Institute's PROCEEDINGS, copy of a letter written to me by the captain of a certain battleship. Doubtless he voices a very general sentiment.

Yours truly,

CASPAR F. GOODRICH,
Rear Admiral, U. S. Navy.

My Dear Admiral:

I have just read your article in U. S. NAVAL INSTITUTE on "Navy Paper Work," and it gave me such encouragement, that I take it upon myself to tell you so. I know of no one who can, in responding to your invitation, tell you that you are wrong in your beliefs but I think everyone, who feels as I do, about the "pall of paper" that hangs over us, to the complete suppression of initiative, should write you, and tell you that your article is splendid—that your beliefs, if put into example now, would do far more good than the volumes of precept pouring out from every possible source.

Admiral, it was a queer coincidence that caused the firs. lieutenant on board here to drop in the cabin, after I had finished reading your article, and while its good features were still in my mind. This officer is exceptionally gifted, having had long duty and varied valuable experience abroad under the State Department, but nevertheless a most excellent, practical officer and especially gifted in writing, expressing himself easily and forcibly. We are preparing for a visit to a navy yard for overhaul. The preparation consists in making out work requests. He is also an observer for certain forms of target practice in which the Office of Operations requires much data in reports, that must be made in at least eight copies of each. Work requests have to be in at least six copies of each item, and only one item may be asked for in each request. He was interested in writing two letters for me, one giving an excellent suggestion for improving the battery; the other for improving the living spaces, by restowing boats, etc. His coming to the cabin was to explain the delay in the last two letters, the reason being the volume of forms he had to prepare. He said he had set a regular night and day watch of yeomen,

four hours on, eight off, continuously typewriting, because the pile of paper measured twenty-one inches deep—I was skeptical, and spoke of your article I had just read. He then had the carpenter measure accurately his pile of neatly laid forms and the actual depth was twenty-six inches! Admiral, this is only an ordinary event. The papers have not accumulated, they have immediately sprung into their ridiculous importance, by the simple and ordinary fact that we are due for overhaul of material from May to September, and the other event, "You are designated as rake observer" for such and such target practice. The reports have to be begun at once because another formidable array of orders says they must be in at a certain moment or another report must be made explaining why. I know of no one thing that would do more real good, in this Navy we all love, than to ruthlessly destroy the fountain source of this tremendous paper work we are bound hand and foot to. I have always believed that the opera *Pinafore* was resorted to to uproot by ridicule some deeply rooted customs in the British Navy—and that the *Mikado* acted in the same manner for Japan. We seem to be really susceptible to ridicule, and it seems the only way we can stop the absurd paper reports and the amount of copies of the same thing. One filling of a typewriter can make four legible copies, but when six or eight and ten copies are required it is not copy but multiple original. The officer I was speaking about says he is going to put a $10.00 note in the seventh or eighth copy, and wait to see if it is ever discovered. The copy he refers to is called "Sheet 12" Gunnery reports, and eight copies of Sheet 12 are required. It sounds very minor, but Sheet 12 with all its innocent aspect, contained more than 100 sheets of official size paper, and when completed was more than one inch thick—and there were eight copies of it—all figures. These eight copies were smooth copies. A rough copy was made when three battleships shot. A smooth copy of the rough was made immediately after the practice for other ships reports. The eight smooth ones were additional.

You once wrote an article "Esprit de Corps," which I heard referred to often by young officers just out of the Academy. It did a lot of good, if it only impressed one officer; and I know that it impressed many. And I most earnestly hope this article of yours may impress the older officers, who are much harder to impress, it is true, but unless they do see it, we will never get rid of this paper evil. The big staffs now composed of young officers who are given authority to write and act "by direction," simply add to the number of reports; for each one of them, to justify his importance to his chief, must have *data* at hand to prove that Captain "so and so" is, or is not, handling his ship correctly. I hope you will pound away at it.

The evil to my mind is more far reaching than simply useless work. It is that our young officers are being brought up to expect an order to cover every minute detail; to ask permission to do everything; to not to do any important thing before the order is given or permission gained. I noticed with a kind of pity this procedure between the boatswain's mate of

the watch and a junior lieutenant officer-of-the-deck: boatswain's mate: "Permission to sweep down on time." "Permission for bugler to blow mess gear on time." "Permission to relieve watch." "Has bridge watch been relieved sir?" To all of which the very dignified officer-of-the-deck replied, "Permission granted," or "Yes." I began to search for the reason. I concluded it was this: The routine is very rigid. Well and good. But ships expect a signal to carry out the routine, and they must not air bedding, as routine says shall be done, unless signal is made to air bedding. The procedure is carried out in other things. We have annual monthly, weekly, and daily schedules to follow, each one specific, and each one is either ordered by signal, or permission obtained. The senior watch today is a lieutenant, the same rank as when you were a captain, but the senior watch then was a man who knew a lot of little wrinkles about standing watch, naval traditions, and naval customs. Our senior watch officers are lieutenants today, and were ensigns or boatswains in 1918. They have had splendid experience in war, and in "after war" procedure anything goes if you can "get away with it." They have no example to follow, and it is not their fault; but they cannot keep setting their own example to the junior watches.

The senior lieutenants are more than willing to learn—but we are teaching them with precepts by the volume. They are having their peacetime character formed by adhering to rule of prescribed orders. Their brother officers and associates are scattered through various staffs, whose "experience" prompts them to advise on orders for everything. Furthermore, orders supposedly coming from high authority are often referred to as "that is Johnny so and so" or "Mike so and so." "He is balled up," or "I will see him and get it changed," and on several occasions I have heard "Not necessary to do anything yet, sir. Detailed letter of procedure is 'coming out.'"

Soon after leaving the Academy, when the fog of conceit in me was penetrated by a broader vision, I often heard discussed in messes the fact that "Our captains now serving as senior captain are master mariners. They have commanded ships since they were young, and as ship handlers they are known the world over. When they are promoted we will be up against it for good captains." Then we would mention Barker, Goodrich, Cotton, Mayo, N. M. Dyer, Mackenzie, etc., and any one of us little ensigns would puff up if we had been shipmates with any one of these. Even Captain Dyer's personalities were discounted by his being one of those wonderful shiphandlers.

We had good reasons to admire and try to emulate our seniors. How will it be now? Do you think I can instill any admiration in a junior, as I had it instilled in me when I was a junior? I feel I owe to every junior in the Navy, everything I have learned in it. I have no right to take away from the Navy anything except self respect. With the system now in use in our Navy, of a detailed, minute, specific, instruction for every tiny thing made by juniors on staffs and in offices, by delegated authority of seniors, under the guise of being *details* beneath the senior's

duty, will we not soon, in course of time, have captains who have known nothing else in their service? In which case, the number of officers on staffs and in offices will have to be increased, because then there will be no ships whose personnel could possibly work out the details of the flag office orders better than such flag office staff could.

I read copiously of officers advocating a central office, and Admiral, I want to cry. Initiative is the one asset America has above all countries, and our central office can't live unless initiative is stifled. I know of no one thing that hurts more than to get some impudent and impertinent message or signal as to why so and so was, or was not, done. I say impudent and impertinent, because one feels *certain* that the initiating idea of such message did not originate in the mind of the flag officer or other high authority, himself; for if so, you know you would deserve it, but you would hear of it in a more impressive manner.

I wonder to myself if I will be spoken of by juniors as I when a junior, spoke of you and Captains Barker, Cotton and Clark? I feel I will not, but rather than being admired as a seaman, master mariner, expert ship-handler, I may be referred to as "one who did not get called down," or "one who knew forms" or "one who did not know forms," or "one who did not let signals 'get his goat'" or "one who did!"

From the length of this letter, I am afraid you will think I am not practicing what I preach, but I hope you will think only of the motive which prompted it, and not the time it takes you to read it.

Some Comments on Amalgamation

(See Page 919, June, 1923, Proceedings)

Commander C. S. Baker (SC), U. S. Navy.—It is with reluctance that one enters the lists, as it were, of the discussion of the proposed amalgamation bill. It seems only fair, however, that some stress should be laid upon certain underlying principles hitherto overlooked by opponents of the measure and that where possible some of the suspicions engendered be dispelled.

Most of us would not be able to determine just what occasioned the publication of the proposed legislation. That some remedy for one or more evils seemed wise, there can be no doubt. Only those who attend the Secretary's council, and even not all of them, would be competent to discuss its *raison d'être*. Beyond peradventure legislation of some sort seemed the *sine qua non* of a more efficient Navy. We can not suppose any other reason. And since it is impossible to place ourselves mentally in the position of those above us confronted with broader aspects of naval problems, it consequently becomes impossible to visualize the situation from their standpoint.

A reason there must be. Hardly could it be said that the bill was proposed to start some of the discussions not infrequently heard and the arguments published. Perhaps it is not amiss to state that in 1920 a

board of line officers was directed to draw up an amalgamation bill. Incidentally they believed amalgamation possible of accomplishment, and the amalgamation of the erstwhile engineer corps a success.

On several occasions in the past officers of command rank and of command experience have stated that amalgamation seemed the only way to accomplish certain things they deemed advisable for the good of the service.

Further back, another Secretary of the Navy, Mr. Geo. Von L. Meyer, directed the drawing up of an amalgamation bill. He strongly advocated such a measure. Apparently some corrective measures were then considered necessary. In fact he said "Amalgamation, broadly speaking, substitutes service interest for corps interest and cannot fail to increase efficiency and remove disturbing factors inseparable from small separate corps. I may point here to the unqualified success of the amalgamation of the old Engineer Corps with the Line."

The original draft of the bill of 29 August, 1916, did not include all the commissioned personnel of the Navy. Other suggested legislation has been but partial in its scope. These bills were intended, among other things, to rectify inequalities in promotion. A single lineal list can accomplish that object. In fact the ultimate paragraphs of the memorandum accompanying the proposed amalgamation bill suggests the necessity for a single list and shows what situation it will meet and improve.

Some one in authority confronted with present day problems, visualizing the future and probably not unmindful of the past, believes in the amalgamation of the Supply Corps, Construction Corps, and the Corps of Civil Engineers with the Line of the Navy.

It is but right, therefore, to assume that amalgamation has its degree of usefulness and that the purpose of the bill is one, like all others the world over, of a corrective and beneficial character. Without conflict of interests there is no law.

There is apparent, a vast and growing opposition to the proposed bill.

One officer describes it as the most "iniquitous" suggestion ever laid before the Navy Department. This opposition is largely the reaction of conservatism against the unfamiliar. Such is as old as history. Conservatism corrects vision. But without vision there is no progress.

Fears readily beset one when consideration is given to the results of any amalgamation. That improvement in the Navy is needed at all times; that situations must be confronted; that avoidable things exist, we all recognize. It will cure some. But that amalgamation is the cure for all is not readily seen. To read with certainty the future is not given mortal mind.

An adequate defense of the bill would be difficult. Its framers admit its incompleteness. Lack of time and the press of other things rendered improbable ultimate smoothness. Needless to say no draft would have met with universal approval and, if one may judge from comments, none with tolerance on the part of but few.

It is easy to find faults with any particular measure. Some are all too obvious. Needless to say the framers were directed to draw up a measure which would comply with certain instructions.

It must also be apparent to the service that in approaching their task the Board endeavors to find ways and means of accomplishing the object set for them, and that only a constructive method would bring results.

That this has resulted in an elimination rather than an amalgamation bill, is one objection. Amalgamation was one of the methods of carrying on during the transition period. A single list of some sort and which would form an amalgamated line seemed a logical step until all former staff officers had disappeared or had become bona fide line officers. That it should result in some eliminations is obvious. It would be manifestly unfair to the present line of the Navy to amalgamate the officers hitherto unaffected by age in grade retirement, as it is at present unfair to staff officers hoping for reasonable promotion. Someone has said that if the line could stand for age in grade retirement other officers in the Navy could. The reasons therefore are just as cogent in one corps as in another. As a matter of fact age in grade retirement will, under the provisions of the bill, affect but very few officers. Most of those who from a present survey of the *Navy Register* might seem to be subject to the provisions of the age in grade retirement, will in all probability have been promoted to higher grades by 1928.

Another insuperable fault found with amalgamation is its failure to allow for specialization. A perusal of the bill should have dispelled that error insofar as the present staff corps is concerned. As for the future, one has to read or to recall the records of innumerable officers of the Navy. It should be borne in mind in this connection that pertinent discussion of the results of this amalgamation can hardly be convincing without direct reference to the revised precedence list for an amalgamated line as drawn up by the framers of this proposed bill.

There is today no provision in law directing the specialization of officers in many branches in the Navy. These activities require the detail of commissioned personnel for considerable periods of time. Many of the officers become proficient along these lines and are known for their proficiency. It is hard to consider them other than specialists. Most of them expect to command at sea. And why not?

A few of these recognized specialties too often forgotten, furnish an illuminating example:

Aviation	Naval Intelligence
Submarines	Observatory
Destroyers	Historical Section
Engineering	Recruiting
Ordnance	Morale Division
Radio	War Plans
Inspection at Yards	War College

Industrial Management	Navy Yard Division
Communications	Publicity
Labor Boards	Admirals' Staffs

We cannot blind ourselves to the fact that experience along these or any other lines renders a man more less of a specialist and as such in demand.

How the Navy Department takes care of such a situation with so many demands upon the abilities of its officers must be left to the imagination of individuals. Does it seem curious that it is, as a rule, done so well?

There are many angles to specialization. In civil life many devote their time to one pursuit. *Per contra* most of our greatest men of business and capitalists have risen through many specialties within their business until they have reached their commanding position in life. They have command in finance, or in oil or in steel, or in shipping or elsewhere. It is difficult to avoid the conclusion that a line officer's many specialties fit him for anything less than command in the Navy. No particular provision, other than educational, is made for the younger officers of the line. Many cannot believe that specialist corps duties are any more difficult than some of the specialist duties performed by officers of the line.

Now whether the business of the Navy, or the building of it will be so well done after amalgamation as before, one cannot say. Some will continue to specialize in those activities and be noted for their abilities. But it is difficult to believe the results will compare less favorably than did the amalgamation of the engineers. Most of the specialization in the Navy is done by the younger officers, while to the older ones fall the duty of administration. How many officers of the grade of commander and above, especially ashore, are performing other than administrative duties?

Considerable argument has been heard against the "bunching" of staff officers and of line officers in certain grades. It is only too apparent that to place the staff officers in the amalgamated line in position more nearly in accordance with their running mates, would bring about such a condition.

At the worst this might result in a commander having command of a battleship—not unheard of—or a captain now a co-ordinator for general supply, or in charge of some local publicity being given more purely line duties. It even might result in a captain being left in command of a navy yard. Cataclysmic?

Early promotion for some members of former staff corps would be effected by the passage of such a bill though they would still be behind officers originally and for years their running mates. The rectification of this condition was an underlying principle of the proposed bill.

Objection has been raised to what is considered a challenge to the staff corps to become line officers. A challenge was not intended. But lest some one say no opportunity was afforded him to change his status, the opportunity was written into the bill.

Further unfavorable comment is often heard on the composition of the Board for Selection. Its composition was designed to avoid the possibility of partiality and to protect the erstwhile specialist corps. At the same time is it not childish to suppose that able officers of rank will reach conclusions not resulting from their intelligence, experience and the oaths to which members of the board would subscribe?

One is much surprised that unfavorable comment should be made on the requisite for sea duty. No matter how able an officer is mentally he cannot expect to understand naval problems in their entirety without sea service, War College training and administrative duties. It is just as essential for a present day constructor or a supply officer to go to sea as it is for a line officer. All are vitally interested in problems aboard ship. With the constant changes in conditions comes the necessity for frequent contact with the changes. How else can an officer keep abreast with his major interest at sea? It is interesting to note that officers are not permitted long tours of duty at the War College no matter how great their competence. Contact with and knowledge of varying conditions in the fleet makes such a policy wise and necessary. Furthermore the retention of officers ashore for indefinite periods presuppose their preëminence in certain activities and occasions for others avoidably long tours of duty afloat. With any other conclusion it is difficult to find reconcilement. No one is indispensable, but sea duty is.

In these days when commanders are heads of departments aboard ship there is no reason for not requiring certain sea duty of them. In the amalgamated line similarity of treatment is mandatory. It was with that idea in mind the sea service proviso was inserted.

There is no great disagreement with the argument that from the Naval Academy should be recruited officers later destined for specialization. Education there has many advantages, all well known. The present course would have to be amplified, new departments and possibly graduate courses established.

Outside the novelty of such an innovation there can be no reasonable objection. Other institutions in this country change their courses to meet current requirements as they see them. Once when graduated from the Naval Academy the requirements of the service would begin to operate. Adaptabilities, preferences, and service needs would all tend to the shaping of an officer's career. In what respect will that differ from present conditions affecting the line? Further broadening of their horizon, of their grasp upon naval problems will result. If a knowledge of any one activity besides deck duties is beneficial, how much more useful will a broader knowledge be? From this broader knowledge flows the extent and scope of organization and administration. To be sure the trend of modern life is toward specialization. But with the growth of the specialities springs the necessity for more perfect organization and administration. From the trained specialists come the administrators. The broader their experience the better they are.

Some one suggested that "officers of the Navy shall be eligible for any duty at sea or on shore compatible with their work to which the Secretary of the Navy, with due regard to their training, experience, and demonstrated capacity may assign them, and while so assigned they shall have and exercise full authority and command over all officers and enlisted men that may be serving under them."

That sentence implies amalgamation or at least the detailing from one lineal list of specialist officers with equal privileges and rights. That is a distinction without being a difference.

Questions of command do not arise among line officers today. Is there any reason to suppose that years after amalgamation shall have achieved its purpose, they will then appear?

We are then safe in assuming that the frequent recurrence of this amalgamation scheme indicates the presence of a problem. A problem demands an answer. It is obviously an administrative problem, the size and extent of which we can only approximate.

It well may be that amalgamation will not solve many of the problems existent today. One thing, however, is certain. It cannot be denied that with the growth of appreciation of the various problems with which separate corps are at present confronted, that their solution becomes the more readily effected. Instances to the contrary as they exist today can readily be quoted. The underlying principle, however, still exists. Only too frequently the separate corps are left as such to fight out their problems without thorough understanding on the part of the majority of officers in the Navy and without their co-operation and sympathy. Under amalgamation much of this would tend to disappear, thus directly benefiting the service as a whole. It seems only too likely that this would be the case. Amalgamation will not automatically eliminate problems of engineering, construction, accounting, yard management, storekeeping and design. But with the increase of additional interests directed toward these problems coming from officers more or less imbued with a similar spirit, their solution unquestionably becomes easier.

One problem possibly possesses factors such as:

Harmonization
Flexibility in assignments of officers
Better co-operation
Substitution of *Navy* for corps spirit
Similar treatment and legislation for all officers
Abolition of special corps legislation
Readjustment of promotions
Common source of entry for all officers
Abolition of extra numbers
Prevention of later stagnation

The present Secretary, like others before him, may believe that amalgamation with certain restrictions would solve the problem.

These are some of the benefits the Board believed would be derived from the proposed bill. This measure to tide over the hybrid period of transition from separate corps to amalgamated line, provided a tentative sketch of the machinery for the purpose.

The Proposed Amalgamation Bill

(See Page 919, June, 1923, Proceedings)

Lieutenant R. E. Bassler (CEC), U. S. Navy.—Should a person read every article concerning amalgamation, he could not help but come to the conclusion that there are underlying reasons which are never brought to the front in these written discussions. It is of course necessary for the solution of any problem that all cards should be laid face upward on a table and frank talk indulged in. The only admitted underlying thought is that the good of the Navy comes first and that any advantage to the individual is to be ignored. For instance, is amalgamation to be considered as for the good of the service because it will provide for the man whose classmate in a corps has reached command rank before he did? Should the friction bugaboo be raised as a camouflage to hide envy? How many more times does the staff officer reach command rank years later than does his line classmate? A fair and frank discussion of amalgamation, with personal considerations forgotten, will do much toward bringing light to the service.

It should be noted also that the recent pay bill, since it is based on length of service, will in the future probably iron out the inevitable effect of any possible inequalities of promotion. This should remove some of the so-called friction in the Navy.

As Commander Fisher has pointed out in his frank article on the proposed amalgamation bill, the proponents of the bill do not state any argument for or the advantages of the proposed amalgamation. These should be given for two reasons: first, to show that the proponents have considered their proposed amalgamation sufficiently to warrant the service in general taking time to study the bill, and second, so that the disadvantages can be compared with the advantages, and an intelligent conclusion reached. The proposed bill, as has been admitted, was quickly thrown together, and without doubt has been given more study by those whom it affected than by the authors of the bill.

Before commenting further on Commander Fisher's article, I would like to invite attention to Commander J. S. McCain's article in the January, 1923 issue of the Proceedings, entitled "A Personnel Survey." The high spots of this article are as follows:

1. Incoming U. S. Naval Academy graduates fill the Navy up to its authorized strength on July 1, 1928.
2. For the next eleven years there will be room for all commanders to be selected up, and age-in-grade retirement will only apply to those deliberately passed-over.
3. Starting with the year 1928, a large number of lieutenant-commanders

will be forced to retire yearly. The vacancies of the previous five years, however, fail to put this into effect until 1932 and thereafter.

4. "In the eleven-year period covered, there will be only seventy-two vacancies for the 157 captains who will retire if not selected." (b)-Page 24.

5. "The predicament of the captains has already caused remark and some activity. That rank having a good deal to do with policy and operation of this Navy, many schemes will be considered to furnish relief." (e)-Page 25.

With reference to paragraphs 4 and 5 above, it is understood that included in some of these captains to be retired are certain groups who will never have any opportunities for selection to the rank of rear admiral. This is certainly a bad thing for the morale of the service, and some solution should be affected and backed up by the entire naval organization in order that injustice may not be done to these line captains. Retirement coming as it will, eight years before a person would normally expect it to come, will find these men in the prime of life and at a particularly difficult age to break into private employment outside the service. Something should be done to take care of these line captains.

As Commander Fisher frankly points out, the proposed bill is merely an elimination bill, and by the year 1928, a startling percentage of staff officers under its terms would have been eliminated, particularly in the upper grades. It may be seen, therefore, that the proposed bill might be considered as furnishing relief in some respects. However, in order to pass any bill which has to do with such a radical reorganization of naval personnel, it will first be necessary to have the service united on any proposed reorganization, since Congress would be very chary about making trouble for itself in future years, unless it could reply to the Navy "Well, you *all* wanted the reorganization bill put through."

With this in mind, the only obvious way to take care of any humps, etc., in personnel is to go to Congress with a reorganization bill that a majority of line and staff officers could back.

Such a solution I believe would be as follows:

1. Establish the following corps: Aeronautics, Ordnance, Radio and Communications, Judge Advocate General, and Engineering (the latter practically a corps now according to testimony given in the hearings on the 1916 Naval Act).

2. Selection to be with running mate up to the rank of lieutenant-commander, and after that by selection boards composed of officers of their own corps.

3. Present Chiefs of Bureaus to be No. 1 in these new corps, and to be the permanent rear admiral of their respective corps.

4. Grades of captain and commander to be increased to six and twelve per cent respectively (or the same percentage as for any other corps). This will take care of quite a few captains.

5. Examination for promotion to be mainly on their corps work, with necessary general knowledge about the rest of the Navy.

6. A compulsory War College course of six months in each rank to cover the tying-in of the particular corps with the rest of the Navy. It might be better in some of the technical corps to have men detailed to civilian technical institutions for certain of these periods.

It must be admitted that insufficient thought has been given to the above proposed solution, but at any rate it is constructive criticism and the advantages obvious. As in the cases of other proposed schemes, the author fails to see the disadvantages of his own proposal. One important advantage of the proposed solution is that not a few line captains could be taken care of since age in grade retirement would not apply in the proposed new corps. It might be desirable to insert a provision which would apply age in grade retirement to all corps, but in view of the slowness of promotion in the upper ranks in corps, this age in grade retirement should apply at fifty, fifty-six and sixty instead of forty-five, fifty and fifty-six for lieutenant commanders, commanders, and captains, respectively.

With regard to the selection board as proposed in the amalgamation bill, to consist of one rear admiral from each of the amalgamated corps, and six line rear admirals, it should be pointed out that as a general rule there would be three officers of the line on the board but little familiar with the qualifications of line officers coming up for selection, and in the case of staff officers coming up for selection, there would be eight officers on the selection board more or less technically unqualified intelligently to select.

The proposed bill in the memorandum accompanying the bill stated "(1) it was assumed that the amalgamation should take place along the lines of the amalgamation in 1899 of the former Engineering Corps with the Line." As to this assumption, I believe there is a considerable difference of opinion in the service and at best after impartially studying the amalgamation of the old Engineer Corps, one would say that assumption is the only word that could be used.

In a previous discussion on the question of amalgamation in the Institute PROCEEDINGS for December, 1921, Captain Jessop advocated the study of certain histories of Army and Navy specialists, and assumed that in each case these duties would boister up his argument for amalgamation. The writer has made two such studies one of which appeared in the December, 1922, issue of the PROCEEDINGS and which covered the Army Ordnance Department. There were nine conclusions drawn from the experience of this department and most deductions presented a reverse argument for amalgamation.

Another study that the writer advised was the study of the amalgamation of 1899, and the following data was studied:

(a) Those sections of the various Chiefs of Bureaus of (Steam) Engineering reports covering personnel from 1881 to date.

(b) *Bennett's History of Steam* in the United States Navy.

(c) Testimony before the Naval Affairs Committee on the 1899 Amalgamation.

(d) Special report on the consolidation of the Bureaus of Construction and Repair, Steam Engineering, and Equipment into one Bureau of Ships.

(e) Testimony given before Naval Affairs Committee on Act of August 29, 1916.

As may be seen from the above, an effort was made to unearth everything bearing on the 1899 Amalgamation, and in order to obtain a proper perspective, the search was started with reports as far back as 1881. As a result of the above study, the writer's intention to present an article covering the 1899 Amalgamation to the NAVAL INSTITUTE PROCEEDINGS was abandoned for two reasons: (1) it would be long and composed mainly of excerpts taken from the above references; (2) some of the points brought out in those references were so acrimonious that it was considered better to adopt a *laissez faire* policy. However, as a result of the above study, the following conclusions were obtained:

1. That the 1899 Amalgamation could be used as an argument against amalgamation.

2. That it refuted the arguments of those amalgamationists who attempt to use it as an argument for amalgamation.

3. The Engineer Corps should be re-established.

This study has been submitted to various officers for their criticism, and thoughts, and in each case it has been an eye-opener for them concerning the true state of affairs in the 1899 amalgamation.

In the writer's article in the December, 1922 issue, the following conclusion was drawn (page 2104). "To make the detail system function properly, there must be an inducement offered in one form or another, whether it be higher rank in the Army Ordnance case, or engineering duty only in the Naval Engineering example. The fear that an assignment to another specialty will decrease his (an officer's) chances of selection up must be removed."

Attention is invited, in view of the above conclusion, to the annual report of the Chief of the Bureau of Engineering, dated September 22, 1921. The following paragraph is taken from the section of the report covering personnel:

"In the report of last year, it was stated that the engineering performance of ships of all types was unsatisfactory, the subject is a matter of personnel rather than of material. . . . In recent years—beginning with promotion by selection—there has grown up in the service an impression that the performance of engineering duty operates to injure the chances of an officer for selection, while the failure of an officer to have experience in engineering does not operate as a deterrent to selection. It matters not that this impression may be erroneous—it exists, and has grown in strength each year, and unless something of a practical character is done to put the stamp of the Department's approval on the performance of engineering duty, the situation will soon be such as to seriously impair engineering efficiency in the Navy."

The report was signed by Rear Admiral Griffin.

Commander Fisher's explanation of friction in the service is excellent, and will bear repetition. Friction as caused by and solely due to the existence of corps in the Navy, I believe to be negligible. Friction caused by mental indigestion, or individual personalities cannot be eliminated by any proposed reorganization of the naval service. As Commander Fisher points out, the friction that can be eliminated is that which is generated when the principle *that authority and responsibility go hand in hand* is violated. He includes in this principle, however, control of the funds, which it would appear, is correct and proper.

Commander Fisher states that the system is to blame for nearly all the troubles erroneously attributed to Corps, and for many more besides. He then cites the points which in his estimation inevitably produce friction and trouble, and then states

". . . . They should be corrected, and they can be corrected by a simple redistribution of bureau duties so as to give each bureau complete control over its work and funds.

"If one bureau could have all design work, and another have charge of all work at industrial yards, ... so that as far as possible no man would have more than one bureau to look to for instructions and funds, the problem of friction . . . . would practically disappear."

While Commander Fisher's diagnosis of the Navy's ailments may be correct, I can hardly agree with his proposed method of treatment, and am decidedly of the opinion that the patient might suffer a relapse after a few years of treatment. One of the greatest causes of friction is that arising from the consideration of personalities, etc., in considering men for billets, and it appears to me that his scheme has many latent possibilities of producing friction between individuals which by a previous statement was one of the things that should be eliminated.

The burden of proof that any radical reorganization of the Navy will eliminate or cure the present defects of the Navy (which the writer believes are mountainous ? mole hills) must rest upon the shoulders of the person advocating it.

First, the defects must be completely isolated, and proved serious.

Second, the analysis of the defects discovered must show that they can be in no way eradicated because of the retention of the existing organization.

Third, it must be conclusively shown that the proposed reorganization will positively eliminate the discovered defects, and last, but most important,

Fourth, it must be shown beyond a reasonable doubt that the new organization will not create new ills or have latent possibilities of their creation, as bad as those eliminated.

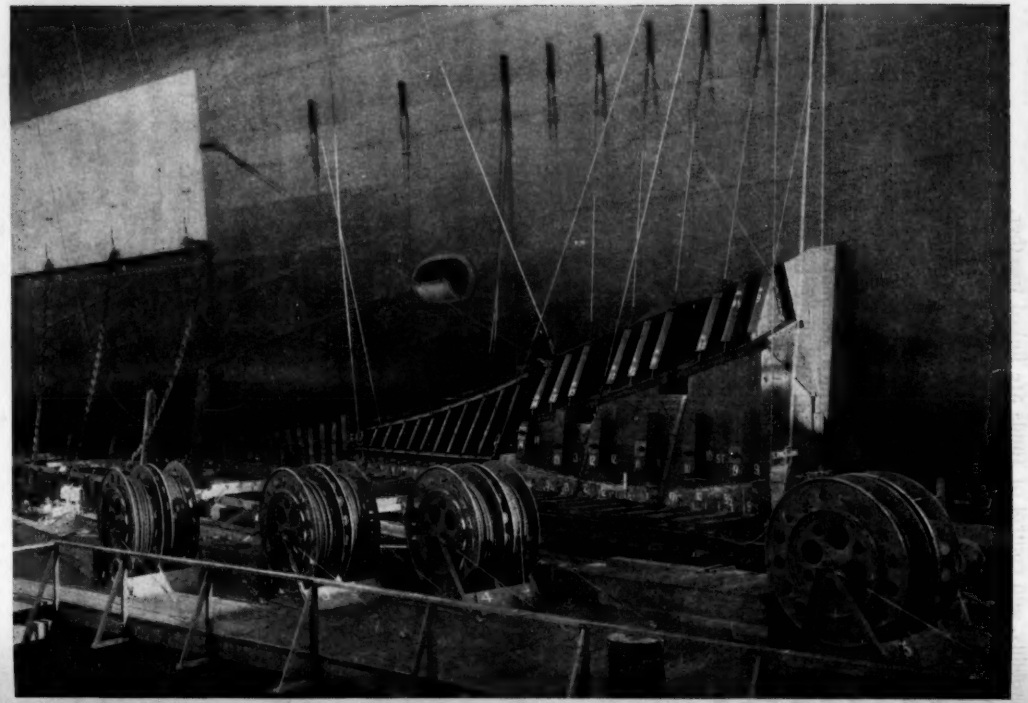
All of which is no small job.

Commander Fisher's conclusion may be summed up in other words; Naval Regulations can either generate or eliminate friction. Naval Regula-

tions are promulgated by the administrative heads of the Navy Department. It, therefore, remains in the hands of the administrative heads to see that regulations are so framed as to provide for the principle that authority, responsibility, and control of funds are linked together.

The activities of the Navy and their successful completion are of paramount importance not only to the naval service, but to the whole country. There can be no doubt after a study of the educational programs of the various branches of the services that specialists are absolutely necessary, and always will be if we are to have efficient fighting arms, and respect for the technical abilities of the personnel directing those arms.

Any amalgamation, therefore, which eliminates specialization or even threatens it, is inherently unsound. If there be no need of specialists within the service, cannot our pacifist friends carry that conclusion to the absurd deduction that we need no Army or Navy at all since they are merely citizen specialists?



DETAILS OF RETARDING GEAR USED IN LAUNCHING OF U. S. S. "CALIFORNIA"

PROFESSIONAL NOTES

PREPARED BY

Lieutenant Commander F. W. Rockwell, U. S. Navy

AND

Lieutenant J. B. Heffernan, U. S. Navy

GENERAL ARRANGEMENT

Vessels Building, Naval Policy, Matériel, Personnel
- Great Britain 1339
- France 1342
- Germany 1344
- Japan 1346
- United States 1348

Merchant Marine 1353
Engineering 1357
Aeronautics 1361
Ordnance 1366
Navigation and Radio 1368
Miscellaneous 1370
Current Notes and Professional Papers 1384

GREAT BRITAIN

Further Details of Submarine "X-1."—London, May 11—The largest under-water fighting ship ever built will be launched for the British Navy this summer. This is the giant submarine *X-1*, which was laid down in November, 1921, at Chatham Navy Yard.

Hitherto all details of this boat have been jealously guarded. The building shed is surrounded by lofty walls, and strict precautions have been taken to keep unauthorized visitors at a distance. Today, however, the Admiralty has authorized publication of the tonnage details of *X-1*. Compared with all previous submarines she is a veritable monster of the deep.

Up to now the record for size was held by the German *U*-cruiser *No. 142*, which displaced 2,150 tons; followed by the British *K*-boats of 1,880 tons. The largest submarines known to be building were the *V* class fleet boats of the United States Navy, which displace 2,025 tons. But all these vessels are eclipsed by the *X-1*, which has a displacement of 2,780 tons on the surface and no less than 3,600 tons when in submerged condition.

To appreciate these figures it must be remembered that many cruisers and gunboats now in service have a much smaller tonnage. The *X-1* is, for example, 400 tons larger than the United States cruiser *Chattanooga*, and only 150 tons smaller than the scout cruiser *Chester*. Nothing official is

known about her machinery or battery, but she is expected to be very fast on the surface and probably will mount a number of 5.5-inch or 6-inch rapid-fire guns, in addition to torpedo tubes.

A submarine of this type carries enough oil to keep her engines going for a trip around the world. Moreover, as the spacious deck will offer plenty of room for exercise and recreation, there is no reason why the crew should not keep as physically fit and enjoy as much comfort as if they were on board a big surface man-of-war. This is a most important factor from the efficiency viewpoint, as in smaller submarines the lack of deck space and the cramped living quarters soon affect the health of the personnel, and limit each cruise to a few weeks' duration.

Submersible cruisers like the *X-1* will be of the utmost value in future naval operations. Remaining at sea independently for months at a time, they will be able to carry out attacks at a distance of thousands of miles from their base. They will also be indispensable as scouts, in which duty they may be aided by small airplanes, capable of being folded up and stowed below deck when the boat is about to dive. In any campaign in which the opposing fleets were separated by a great stretch of ocean, a squadron of these giant submarines would probably be of more use than a division of battleships.

On the other hand, their great size involves serious drawbacks. They require more careful handling than smaller submarines, and the slightest error of judgment may cause their destruction. Before the *X-1* can dive she must take in nearly 1,000 tons of water, and each of the numerous hatches and openings in the deck has to be closed before any water is admitted to the ballast tanks. When the tanks are flooded and the boat begins to dive her downward momentum must be checked at exactly the right moment; otherwise she may plunge deeper than the safety line and have her sides crushed in by the tremendous pressure of the water, as happened to the British submarine *K-5* in January, 1921.

There are rumors, at present unconfirmed, that Japan is building a submarine cruiser of even greater dimensions than the *X-1*, with a displacement of nearly 3,000 tons on the surface. But it is doubtful if Japanese constructors and engineers, clever as they are, possess the experience and skill which are necessary to build a successful boat of this size. The two largest types of Japanese submarines commenced up to now displace 1,500 and 2,000 tons respectively.

American naval experts now in England have been greatly interested in the *X-1*, and there is reason to believe that they were informed of her principal details by the Admiralty some time ago.—Hector C. Bywater in *Baltimore Sun*, 4 June, 1923.

NEW AIRCRAFT CARRIER.—The visit of the Director of Naval Equipment to Devonport for the purpose of inspecting the new aircraft carrier *Hermes* comes as a reminder that this vessel is nearing completion, and is expected to be ready for her official trials this summer. For the present the *Hermes* is a "Hush!" ship, and, as she is the first vessel in the world specially designed for transporting aircraft, information with regard to her chief characteristics is awaited with considerable interest.

Compared with other vessels converted or reconstructed for service as aircraft carriers, the *Hermes* is small for her displacement is only 10,950 tons, whereas the *Eagle* displaces 22,790, the *Furious* 19,100, and the *Argus* 14,450 tons. These figures indicate how greatly war experience has changed the views of naval experts as to the ideal size of vessels of this type. The change probably is due as much to the smaller area now required for flying off and landing as to the fact that the flying decks offer a splendid target for hostile aircraft, and are extremely vulnerable.

The *Hermes* will have a speed of 25 knots, and will carry seven 6-in., four 4-in. anti-aircraft, and nine smaller guns, in addition to torpedo armament. Fitted with two hangars, she will carry about twenty machines, electric lifts being provided to raise them to the flying-off decks. She has a tripod mast, and this, with single funnel and superstructure, forms an island on the starboard side amidships. Thus nearly the whole width of the deck is clear, and the arrangement has the additional advantage that it permits an almost unobstructed all-round view from the flying deck.—*Naval and Military Record,* 30 May, 1923.

BRITAIN REORGANIZING HER NAVAL DEFENSES.—London, June 4.—Great Britain has begun the reorganization of her naval defenses, in consequence of the return of normal post-war naval conditions and in conjunction with the Washington Treaty.

During the next few months the disposition of the British naval units will be watched with great interest by naval experts. What Great Britain lost at Washington in the way of naval strength she may gain back by strategic disposition of her forces.

An imperial conference will be held in London next October, when the Dominions will be consulted with regard to future naval policy. It is authoritatively stated that at this conference the Dominions will be invited to cast their naval lot with that of the mother country, and the result may be that the British Empire naval units will be under the consolidated control of the First Lord of the Admiralty in London.

Australia, Canada, New Zealand and South Africa maintain naval forces, which, though not a great strength, are nevertheless possible units for a great naval combine.

Archibald Hurd, well-known British naval expert, discussing these Dominion naval forces, declares that a unified empire navy is necessary for the safety of the empire.

"There can be no such thing as 'local navies' if the empire is to be safe," Hurd declares. "That is, navies tied down to a duty in special areas in conditions of war as well as peace. Any attempt to localize the beneficent influence which naval power can exert spells disaster, less perhaps to us than the peoples overseas. By some means autonomy must find expression in a larger patriotism, which recognizes the unity of the seas, but need not involve any derogation from the full self-governing rights of ourselves or the Dominions."

Pending possible amalgamation of the British naval forces and the Dominion forces, the Admiralty is not standing still in the matter of realignment of British naval policy. Already steps have been taken to return to the old pre-war principle of naval strategy whereby the bulk of the British Fleet was kept in the Mediterranean—known as the "Middle Sea."

Little by little the naval units are leaving home waters and taking their position in the "Middle Sea," where they are within comparatively easy striking distance of the strategic naval points of the world. Gradually battleships are being transferred from the Atlantic Fleet to the Mediterranean Fleet and necessary changes in transport and supply are being made. There are promises that within a few months Malta will again be the most important British naval base. Thus it seems that the Admiralty is again returning to the strategic principle of a mobile fleet stationed in the "Middle Sea" ready for service in any of the seven seas.

The readjustment of strategic policy by the Admiralty is not without its critics, but the work is going ahead and there is every indication that Great Britain has no thought of losing grip upon her control of the seas.—*Baltimore Evening Sun,* 4 June, 1923.

NAVAL LIMITATION.—Elsewhere in this number reference is made to the proposals for restricting the naval armaments of South America which have been put forward at the Pan-American Conference now in session at Santiago de Chile. Unlike the Washington Treaty, which affects only capital ships and aircraft carriers, the Chilean scheme provides a fixed ratio of tonnage for all types of fighting craft. According to this, Argentina, Brazil, and Chile would each be allowed to maintain 66,000 tons of capital ships, 85,000 tons of auxiliaries (cruisers, destroyers, etc.), and 15,000 tons of submarines. The agreement would be for a period of five years from date of ratification, and would be renewed for a second period of the same duration unless denounced two years before the date on which it expired. In the second period the allotment of capital ship tonnage would be raised to 90,000 tons.

Under this scheme the "life" of a warship would be fixed at seventeen years, after which it could be replaced by a new vessel, provided the maximum tonnage was not exceeded. The definition of capital ship is that laid down by the Washington Treaty. An important feature of the scheme is that unarmored ships already in service would not be reckoned in a computation of tonnage. These proposals have been referred back to the various Governments concerned. If accepted, they will not only mark another important step in the process of limiting armaments by reciprocal agreement, but may encourage the United States to proceed with its cherished plan of bringing all classes of fighting tonnage, including submarines, within the scope of the five-Power limitation treaty, thus fulfilling the original intention of its authors.—*Naval and Military Record*, 2 May, 1923.

FRANCE

FRENCH NAVY NOTES.—The value of turrets is enhanced by the lessons of the war and by the results of recent comparative tests. Under the new conditions of war, with a ship simultaneously attacked by seaplanes and guns, as will invariably prove to be the case in proximity to coasts, the deck of fighting ships will be an inferno, all flames and poisonous smoke and flying splinters—no life, no fighting possible on the part of men unprotected or insufficiently protected behind shields, whereas in roomy turrets of new design (adapted to chemical warfare), gunners with their heads covered with masks will aim and fire in relative comfort and security, all the more so as the walls of turrets will stop both splinters and poisonous burning waves, and the air inside can be purified and renewed by various processes, imitated from what is being done in submarines. It is for this reason that the 8,000-ton French *Primauguets* are considered to be better fighting machines, under certain conditions, than the British *Raleighs* and the American *Omahas*. *Le "Raleigh" pourrait frapper plus dur, mais comme il est mal protegé, le "Primauguet" pourrait répondre avec plus d'effet, et à égalité, de valeur de part et d'autre la victoire devrait appartenir au croiseur francais.*" Such are the words of a French cannonnier "in the know."

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How to conciliate extreme range with shell power has been the absorbing problem foremost in the minds of our experts. It has been solved, though not without a substantial addition to the weight of naval ordnance; and the effects of the new *obus chimiques* (armor-piercing, asphyxiating, incendiary) mark so great an advance, on the past, in the matter of deadliness, that it is proposed in some quarters to stick to the 155 mil. type in all our cruisers, the caliber length and range being gradually extended so as to keep up with the times and to excel rival calibers. The fifty-kilo shell of the 155-mil. guns is held to be sufficient, at any distance, against the

lightly-built and thinly-armored cruisers of today and tomorrow. It will never hit the mark without bursting, and never burst without putting *hors de combat* a good part of the enemy ship, blinding and poisoning crews, and filling the ship with flames and smoke. Ten sixty-five-caliber guns of 6.1-inch bore would hit further and quicker than eight eight-inch weapons of fifty calibers. War data are nothing to go by: *obus chimiques* are a *fait nouveau* that revolutionizes warfare.

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In what concerns battleship turrets, expert opinion in Paris approves the novel arguments that caused the London Admiralty to adopt the triple-gun type in the *Rodney* and *Nelson*. In the first place, against one-ton (or more) shells, gunhouses, to steadily withstand the fearful shock and smash, need to be as massive and heavy as possible. Secondly, there must be as much space and as many facilities to renew the air as possible, with special appliances intended to counteract the effects of incendiary and poisonous shells and liquids. Those artillery and chemical *ingenieurs* best acquainted with the new aspects of the turret problem and with the results of laboratory researches and practical experiments on shore have found out that the ten-meter wide quadruple-turrets constructed for the now discarded *Normandie* class were very much in advance of their times in every respect and are fully adaptable to the requirements of modern warfare. This adds to the deep regret felt in naval circles at the folly of Ministers of Marine in discarding 25,000-ton twelve-gun battleships individually worth, for the purpose of long-range fighting at sea, twice as much as an Italian *Doria* and nearly twice as much as a *Paris*—in the modernizing of which so much money is being wasted at the present moment.

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French naval aviation is silently and steadily progressing, as the twofold consequences of the combined efforts of naval authorities and private firms. The forthcoming realistic experiments in the 18,000-ton *Vergniaud* are expected to throw light on the comparative value of volume of fire versus caliber of shells and bombs in bombing tactics, and also on whatever possibilities exist to defend the buoyancy of warships and the lives of crews against the attack of monster shells, bombs, and torpedoes. Here it may be stated that Paris *ingenieurs* who are giving attention to the protection of ships against vertical hits, a totally new problem, are confident that ultimately a way will be found to provoke the premature explosion of bombs and torpedoes, before they can strike decks or turrets, by means of much-strengthened aerial Bullivan nets, steel bars, or thin plating, though to provide complete defense (aerial, submarine, and waterline) and render fighting ships practically insubmersible some 60,000 tons of displacement are considered to be necessary. The first Power technically, financially, and industrially capable of producing the new class of insubmergible mastodons to carry 18-inch guns, firing 3,300lb. shells, will throw into obsolescence all existing battleships and all Panama Canal 35,000-ton ships, and *de facto* acquire the command of the high sea against all comers. France is in a position to design such ships, but not financially able to construct them. Besides, France, bent on retrenchment, has no use for the mastery of the high sea in the old sense. But it is considered probable 60,000 or 70,000-ton ships will be commenced by the ocean naval Powers (Britain, Japan, America) before many years have elapsed. The Washington agreement is thought to be too fragile a barrier to stop, even for a few years, the logical development of the battleship type, especially since 35,000-ton ships, however skilfull the design cannot be considered as complete fighting ships, and, all points considered, are relatively as vulnerable as pre-war battleships.—J. B. Gautreau in *Naval and Military Record*, 2, 16, 23 May, 1923.

APPROVES NAVAL PACTS WITHOUT RESERVATIONS.—Paris, June 6.—The Government's intention to ask Parliament to ratify the Washington naval accords without formal reservations was put into effect today. Georges Leygues, president of the Foreign Affairs Commission of the Chamber of Deputies, announced that Premier Poincaré had decided to withdraw the ratifying bill now before the commission and substitute a straight-forward ratification. Any reservations, he said, would take the form of comments inserted in various commissions' reports.

The new bill must be examined by a number of different commissions and several reports on it prepared so that actual ratification of the accords may be delayed many weeks.—*Baltimore Sun*, 7 June, 1923.

GERMANY

MOST RECENT SUMMARY OF GERMANY'S LOSSES.—London, May 31.—In the year 1898 there appeared in Berlin the first number of a new naval annual called *Nauticus*, which contained all manner of information and statistics relative to the maritime interests of Germany. This publication was ostensibly unofficial, as might have been inferred from its outspoken comment on foreign politics and its tone of hostility toward England. It seemed incredible that a book in which the aims and ideals of a friendly nation were so misrepresented could enjoy any sort of official sanction or support.

Nauticus continued to appear annually down to 1914, and year by year its influence grew more potent. Not until after the war did Admiral von Tirpitz, the former head of the German naval administration, disclose in his memoirs the fact that *Nauticus* had been founded by him to make propaganda for his far-reaching naval schemes. All those years, therefore, a German Government department had been financing and editing a book whose manifest purpose was to cause bad blood between two erstwhile friendly nations, and to create in the German mind an idea that England alone stood between the Fatherland and the attainment of its legitimate ambitions.

Apart from its evil political influence *Nauticus* ranked high as a textbook on naval and shipping affairs, for which reason it enjoyed a large circulation in Germany. Publication was suspended on the outbreak of war, and when the struggle came to an end, leaving Germany with only a remnant of her former naval strength, it was commonly believed that the last had been heard of *Nauticus*.

Not so, however. A new edition of the book has just appeared, the first since 1914, and while nominally published by Admiral Hollweg, it bears all the old marks which identify it as an organ of the German Government. The present editor, it may be recalled, was the author of Germany's official apologia for the *U*-boat campaign, entitled *Unser Recht auf den U-bootskrieg*, in which he quoted Scripture as justification for the sinking of enemy shipping.

The new *Nauticus*, like the old, is largely made up of propaganda material. Many pages are devoted to the recitation of Allied crimes against the innocent Fatherland, and there is, of course, a wealth of so-called evidence in proof that the payment of reparations on the Versailles scale is utterly beyond the power of exhausted Germany.

We learn, not for the first time, that the Allied "victory" was a delusion. The German Navy was never beaten. Its ships, officers and men were superior to all others, and it would unquestionably have triumphed in the end had not the wicked Lord Northcliffe undermined the discipline of its personnel by his diabolical *Lügenfeldzug*. Anyone reading German post-war literature might suppose that the Allied fleets and armies weighed not a feather in the scales of war and that mighty Germany was brought

crashing down in ruins by the all-powerful pen of Lord Northcliffe. This legend of a "stab in the back" has been repeatedly exposed by a few honest German writers, who admit that the fighting spirit of the Kaiser's army and navy had begun to decline long before the Allied propaganda became effective.

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Nauticus has something to say, about the Washington Conference, of which, it seems, England was the real author, though, with her usual cunning, she managed to convince Americans that the idea of disarmament originated with them. The outstanding features of the conference was the demonstration it gave of the community of British and American policy in the Pacific, and their mutual resolve to prevent the establishment of a hegemony in the Far East by any third party.

The results of the conference are summed up in these words: "Taken as a whole, it represented a grandly planned attempt to reconcile by peaceful means the conflicting interests of the nations before they led the world into a new war. But the decisive factor in bringing about such results as the conference achieved was the *power* wielded by the various participants. It was by virtue of her power that France was able to resist the limitation of submarines, just as it was the combined power of Anglo-Saxondom that compelled Japan to abandon her political objectives. Those who hoped that Washington would be the cause of universal abandonment of armed force as an instrument of policy have been disappointed. Since it failed to eliminate the deep-seated differences of a political and economic nature which lie at the root of all international antagonisms, it was naturally unable to persuade the nations to give up the weapons on which, in the last resort, they must rely for the maintenance of their existence."

What Germany has lost in material assets as a consequence of defeat is set forth in a series of tables which have not hitherto been published in such a compact form.

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Other tables deal with the German mercantile marine before and after the war. In 1914 this fleet consisted of 5,100,000 tons gross, of which 1,406,848 tons were seized in foreign harbors (America alone acquiring 589,000 tons). Adding to these losses the ships captured during the war or subsequently delivered under the Versailles treaty, a total of 4,672,439 tons was forfeited. *Nauticus* might have added, however, that this was only about one-third the amount of foreign tonnage which Germany's *U*-boats destroyed in the war. After deducting all war-time losses and subsequent surrenders there remained only 427,561 tons of shipping under the German flag.

That was in 1919. Today, four years afterward, the German mercantile marine numbers 2,451,000 tons of shipping, or nearly half as much as the pre-war total; this swift recovery being due on the one hand to energetic shipbuilding, and on the other to the repurchase of surrendered ships. Impoverished though she may be, Germany has yet been able to find plenty of cash for the reconstruction of her commercial navy.

Despite all the havoc wrought by war and the uncertain political outlook, *Nauticus* concludes its review of the situation on a note of optimism. It foresees a time, none so distant, when Germany, by dint of hard work, thrift and a rational conduct of domestic and foreign policy, will have regained much of her former prosperity, if not of her political power and armed strength. All right-minded people will share that anticipation, for nothing is more certain than that Europe will never recover from the effects of the war until the economic and political system of Germany is once more on a sound basis. But the disquieting feature of German life today is the marked influence still exerted by the militarist revenge-at-all-costs

school, whose sinister aims are traceable in these very pages of *Nauticus*.—Hector C. Bywater in *Baltimore Sun*, 17 June, 1923.

NEW "GOEBEN" STORY.—Mr. Winston Churchill has told us how the German cruisers *Goeben* and *Breslau* evaded the British ships which sought to bring them to action in the Mediterranean. Now we have from the Paris correspondent of *The Daily Express* a sensational story to the effect that their escape was largely due to M. Venizelos, who was Premier of Greece at the time.

According to the correspondent, on the night of August 5, 1914, Count Quadt, the German Minister at Athens, received a cipher telegram from Berlin informing him that the *Goeben* and *Breslau*, then being pursued by Admiral Sir Berkeley Milne's squadron, urgently required coal, and would wait for it at Domansi, a tiny island near Naxos. The Greek commander of the port of Piræus was asked to sign an order authorizing the delivery of 800 tons of coal, but refused. Count Quadt then went to the house of M. Venizelos. It was two o'clock in the morning, but the Prime Minister was aroused from his bed, and, according to the story, wrote on one of his own visiting cards a request to the commander of the port to allow the German Consul, who was also a coal merchant, to have the coal for the German ships. So the coal was sent, the German cruisers reached Constantinople, and Turkey came into the war, with all the ghastly consequences.

The correspondent adds that M. Venizelos admits giving the order, and says that his action was strictly in conformity with the law of nations and Greece's obligations as a neutral state.—*Naval and Military Record*, 9 May, 1923.

JAPAN

JAPANESE NAVY NOTES.—An extraordinary run of bad luck seems to have pursued the Japanese Fleet on its training cruise to the South Seas during February and March. On February 11 an explosion took place in the engine room of submarine *No. 34*, causing several casualties and apparently disabling the boat, which was taken in tow by the light cruiser *Natori*, flagship of Vice Admiral Saito. On the following day a very serious accident happened to the *Natori* herself, while steaming near the Bonin Islands; one of the boilers exploded, killing twelve engineer officers and ratings. The cause of the disaster remained a mystery, as the entire personnel in charge of that particular boiler were killed on the spot. The *Natori* was serving at the time as leader to a destroyer flotilla. She is the latest light cruiser to be commissioned, having finished her trials only a few months since. Laid down at the Mitsubishi yard in Nagasaki in December, 1920, she was launched in February, 1922. Her leading details are:—Length, 535ft. overall; beam, 46¾ft.; draught, 16ft.; displacement, 5,570 tons; designed speed, 33 knots; main armament, seven 5.5-inch guns. The ship has geared turbines and fourteen boilers, most of which burn oil fuel. All the machinery is very light, weight having been cut down to the minimum, as in the scantlings of the hull, but similar plants installed in previous units of the class have stood the strain of service admirably. Assuming the speed records to be trustworthy, the performances of these new Japanese cruisers are truly remarkable. All the ships of the *Kuma* class are reported to have exceeded their contract speed of 33 knots, some having reached 34 knots on the measured mile. These results are obtained largely by a ruthless cutting down of weight in every direction, but even so they connote a high degree of skill on the part of Japanese constructors and engineers.

Several other mishaps, fortunately of a less serious nature, occurred during the South Seas cruise. Heavy weather was met with at one time,

the battle cruiser *Kongo* losing some men who were swept overboard; the destroyer *Shiokaze* reported a fire in the engine room, which caused one death and other casualties; and several destroyers and submarines received damage to their propellers, and steering gear.

An explosion took place on March 15 in the new submarine, *No. 75*, which is building at the Kobe Mitsubishi yard. Two workmen were killed outright, others were seriously injured, and some damage was done to the internal fittings of the boat.

Following the launch on March 5 of the light cruiser *Yubari*, the *Abukuma* another vessel of this same general type but of large dimensions, took the water on March 16. She was begun by the Uraga Dock Company on December 8, 1921, and was accordingly the first Japanese warship to be laid down after the Washington Conference had assembled. Whereas the *Yubari* is of only 3,100 tons, the *Abukuma* is of 5,770 tons, her other particulars being identical with those of the *Natori*. She is the fourteenth Japanese cruiser to be launched since 1917. Two of these ships were put afloat in 1918 *(Tatsuta, Tenryu)*, one in 1919 *(Kuma)*, four in 1920 *(Tama, Oh-i, Kitakami, Kiso)*, two in 1921 *(Isudzu, Nagara)*, three in 1920 *(Yura, Natori, Kinu)*, and two this year *(Yubari, Abukuma)*. The number of cruisers now on the stocks is not exactly known, but they include the *Jintzu, Naka, Sendai, Kako*, and *Furutaka*, some of which are of 7,100 tons, while one or two of the others may be small ships of the *Yubari* class.

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According to French reports, the Japanese light cruiser *Kinu* has been commissioned, having finished her trials in February. She was laid down in January, 1921, and launched on May 29 last year. Like all Japanese cruisers of recent design, she carries two aeroplanes and flying-off gear. From the same it is reported that a cruiser of 7,100 tons has been begun at Nagasaki (Mitsubishi yard), and that the aircraft carrier *Hosho* has hoisted the pennant; but this last item awaits confirmation.

The Japanese Admiralty has issued a statement with regard to its plans for scrapping surplus ships, as follows: All the material which had been assembled for the building of the battlecruisers *Atago* and *Takao* is now removed. Preliminary work in connection with dismantling the battleships *Kaga* and *Tosa* has been finished. The reconstruction of the *Akagi* and *Amagi* as aircraft carriers was suspended at the end of last year. The gun turrets and sixty heavy guns have been removed from the thirteen armored ships to be scrapped. These and other condemned or suspended ships are now lying at the following ports: At Yokosuka—*Kaga, Amagi, Aki, Satsuma, Asahi, Mikasa*, and *Fuji*. At Kure—*Tosa, Akagi, Settsu*, and *Ibuki*. At Sasebo—*Ikoma, Kurama, Hizen*, and *Shikishima*. At Maidzuru —*Katori* and *Kashima*. After the removal of their armament the *Shikishima* and *Asahi* are to be retained in the Navy as training ships.

The Japanese gunboat *Hira* one of the four ships of that type authorized under the 1920-28 Fleet Law, was launched at Hankow on March 24, having been assembled there by the Yangtse Engineering Company from material supplied by the Mitsubishi firm in Japan. Designed for up-river patrol work, the *Hira* is 120 ft. long, 27 ft. broad, and draws 7 ft. of water. She is noteworthy as being the first warship built by Chinese labor in a Chinese yard for a foreign Power. A second Japanese gunboat of the same type is being put together at Hankow. They will be armed with 12pdrs. and machine-guns.—Hector C. Bywater in *Naval and Military Records*, for 9 and 16 May, 1923.

UNITED STATES

VESSELS UNDER CONSTRUCTION, UNITED STATES NAVY—PROGRESS AS OF MAY 31, 1923

Type Number and Name	Contractor	Per cent of Completion				Contract date of Completion	Probable date of Completion
		June 1, Total	1923 On Ship	May 1, Total	1923 On Ship		
BATTLESHIPS (BB)							
45 *Colorado*	New York S.B. Cpn.	98.3	98.3	97.6	97.6	.....	9/ 1/23
47 *Washington*	New York S.B. Cpn.	.....	.....	.....	.....	.....	Suspended
48 *West Virginia*	Newport News S.B. & D. D. Co.	89.5	88.6	88.4	87.4	.....	10/15/23
49 *South Dakota*	New York Navy Yard	.....	.....	.....	.....	.....	Suspended
50 *Indiana*	New York Navy Yard	.....	.....	.....	.....	.....	Suspended
51 *Montana*	Mare Island Nvy. Yd.	.....	.....	.....	.....	.....	Suspended
52 *North Carolina*	Norfolk Navy Yard	.....	.....	.....	.....	.....	Suspended
53 *Iowa*	Newport News S.B. & D.D. Co.	.....	.....	.....	.....	7/12/23	Suspended
54 *Massachusetts*	Beth. S.B. Cpn. (Fore River)	.....	.....	.....	.....	7/12/23	Suspended
BATTLE CRUISERS (CC)							
2 *Constellation*	Newport News S.B. & D.D. Co.	.....	.....	.....	.....	.....	Suspended
4 *Ranger*	Newport News S.B. & D.D. Co.	.....	.....	.....	.....	.....	Suspended
5 *Constitution*	Philadelphia Nvy. Yd.	.....	.....	.....	.....	.....	Suspended
6 *United States*	Philadelphia Nvy. Yd.	.....	.....	.....	.....	.....	Suspended
AIRPLANE CARRIERS (CV)							
2 *Lexington*	Beth. S.B. Cpn. (Fore River)	36.4	27.7	35.6	26.9	.....	Indefinite
3 *Saratoga*	New York S.B. Cpn.	31.9	29.1	31.5	28.7	.....	Indefinite
SCOUT CRUISERS (CL)							
5 *Milwaukee*	Todd D.D. & Const. Cpn.	99.9	99.5	99.6	98.4	12/ 1/21	6/15/23
6 *Cincinnati*	Todd D.D. & Const. Cpn.	97.	94.	95.	92.	7/ 1/22	10/ 1/23
7 *Raleigh*	Beth. S.B. Cpn. (Fore River)	87.2	78.3	85.8	76.6	8/ 1/21	9/ 1/23
8 *Detroit*	Beth. S.B. Cpn. (Fore River)	99.1	98.9	98.2	97.5	11/ 1/21	7/15/23
9 *Richmond*	Wm. Cramp & Sons Co.	99.5	99.3	98.3	97.6	.....	6/30/23
10 *Concord*	Wm. Cramp & Sons Co.	95.5	93.	94.5	91.7	.....	11/15/23
11 *Trenton*	Wm. Cramp & Sons Co.	73.5	65.5	72.5	64.5	10/ 1/21	Indefinite
12 *Marblehead*	Wm. Cramp & Sons Co.	57.7	48.	56.6	46.8	1/ 1/22	Indefinite
13 *Memphis*	Wm. Cramp & Sons Co.	51.3	40.7	50.3	39.7	4/ 1/22	Indefinite
AUXILIARIES							
Repair Ship No. 1	*Medusa* (AR1) Puget Sd. N. Yd.	92.6	88.1	91.5	86.7	.....	10/ 1/23
Dest. Tender No. 3	*Dobbin* (AD3) Phila. Nvy. Yd.	78.5	78.3	77.9	77.7	.....	Indefinite
Dest. Tender No. 4	*Whitney* (AD4) Boston Nvy. Yd.	70.9	67.2	68.1	64.	.....	Indefinite
Sub. Tender No. 3	*Holland* (AS3) Puget Sd. Nvy. Yd.	22.8	7.3	21.6	5.5	.....	Indefinite
PATROL VESSELS							
Gunboat No. 22	*Tulsa* (PG22) Charleston Nvy. Yd.	95.8	93.8	94.9	91.8	.....	9/ 1/23

Type Number and Name	Contractor	Per cent of Completion				Contract date of Completion	Probable date of Completion
		June 1, Total	1923 On Ship	May 1, Total	1923 On Ship		
SUBMARINES							
118 *S-13*	Portsmouth N.H. Nvy. Yd.	95.9	95.4	95.4	94.2		7/15/23
123 *S-18*	Elec. Boat Co. (Quincy)	98.6	98.6	98.6	98.6	7/ 1/22	10/—/23
126 *S-21*	Elec. Boat Co. (Quincy)	98.7	98.7	98.4	98.4	10/30/22	7/—/23
127 *S-22*	Elec. Boat Co. (Quincy)	98.6	98.6	98.6	98.6	10/30/22	11/—/23
128 *S-23*	Elec. Boat Co. (Quincy)	98.6	98.6	98.5	98.5	11/30/22	8/—/23
129 *S-24*	Elec. Boat Co. (Quincy)	98.9	98.9	98.	98.	11/30/22	7/—/23
130 *S-25*	Elec. Boat Co. (Quincy)	99.5	99.5	98.8	98.8	11/30/22	6/—/23
131 *S-26*	Elec. Boat Co. (Quincy)	97.9	97.9	97.5	97.5	12/30/22	8/—/23
132 *S-27*	Elec. Boat Co. (Quincy)	97.6	97.6	97.6	97.6	12/30/22	9/—/23
133 *S-28*	Elec. Boat Co. (Quincy)	97.5	97.5	97.5	97.5	12/30/22	9/—/23
134 *S-29*	Elec. Boat Co. (Quincy)	97.5	97.5	97.5	97.5	1/30/23	10/—/23
140 *S-35*	Elec. Boat Co. (San Fran)	Comm.	5/ 7/23			3/30/23	
142 *S-37*	Elec. Boat Co. (San Fran)	98.8	98.6	97.4	97.1	10/10/22	6/11/23
143 *S-38*	Elec. Boat Co. (San Fran)	Comm.	5/11/23	99.6	99.6	10/30/22	
144 *S-39*	Elec. Boat Co. (San Fran)	93.3	93.2	90.4	90.2	11/19/22	7/20/23
145 *S-40*	Elec. Boat Co. (San Fran)	88.3	86.	87.6	85.3	12/29/22	9/ 1/23
146 *S-41*	Elec. Boat Co. (San Fran)	89.6	87.7	88.9	86.9	12/29/22	10/ 1/23
153 *S-42*	Elec. Boat Co. (Quincy)	93.9	93.5	93.6	92.9	5/15/23	12/ 5/23
154 *S-43*	Elec. Boat Co. (Quincy)	94.5	94.2	94.4	93.9	6/15/23	11/30/23
155 *S-44*	Elec. Boat Co. (Quincy)	91.3	85.8	91.2	85.5	6/15/23	3/ 7/24
156 *S-45*	Elec. Boat Co. (Quincy)	92.8	88.9	92.3	88.	7/15/23	12/21/23
157 *S-46*	Elec. Boat Co. (Quincy)	91.1	84.4	90.7	83.5	7/15/23	1/ 5/24
158 *S-47*	Elec. Boat Co. (Quincy)	90.2	82.6	90.1	82.3	8/15/23	4/ 7/24
FLEET SUBMARINES							
163 *V-1* (SF4)	Portsmouth N.H. Nvy. Yd.	43.4	42.8	42.7	42.3		Indefinite
164 *V-2* (SF5)	Portsmouth N.H. Nvy. Yd.	34.9		34.4			Indefinite
165 *V-3* (SF6)	Portsmouth N. H. Nvy. Yd.	34.8		34.3			Indefinite

Authorized but not under construction or contract:
Destroyers—(12) Nos. 348 to 359 inclusive.
Transport—(1) No. 2.
Fleet Submarines—(6) Nos. 166-171.
Neff Submarine (1) No. 108.

SPEED TRIALS OF U. S. S. "DETROIT."—Officials of the Fore River plant of the Bethlehem Shipbuilding Corporation at Quincy and members of the picked crew that took the new United States scout cruiser on her trial trip off Rockland, expressed much satisfaction today with the performance of this latest product of the Quincy yard. The vessel, which is the highest powered ship ever built in the United States and which is called the fastest ship on the seven seas, returned to Quincy yesterday afternoon from her trials with brooms lashed to her mastheads and with the figures 35.7 painted on her smokestacks, indicating that she had set a new record and broken her estimated speed of 35 knots.

The excellence of the trial performance of the vessel, particularly the propelling machinery, and the close agreement of the results of trials with the estimated or anticipated results, bearing in mind the fact that the vessel was manned entirely by the shipbuilders, engineers and mechanics who are accustomed to the construction rather than to the operation of vessels, is a high tribute to the skill and efforts of the management and employees of the Bethlehem Shipbuilding Corporation.

The vessel is in effect a very fast and powerful destroyer, having a length of 555 feet, a breadth of fifty-five feet and a normal load displacement of 7,200 tons. She carries twelve 6-inch rapid-fire guns of the latest

model, four 3-inch anti-aircraft guns, capable of firing into the air at any angle up to ninety degrees, ten torpedo tubes fitted to fire the latest model 21-inch long-range torpedoes, and more than two hundred mines which can be launched over her stern and laid in a very few minutes while running at full speed.

She is fitted to carry airplanes which can be launched from revolving catapults while running with, against or across the wind; also with high power radio apparatus, wireless telephones, submarine signalling apparatus, electric steering gear, laundry, workshop, hospital, etc.; in fact, she is in all respects the last word in design, construction, equipment and armament which lessons of the World War showed to be essential for carrying out duty to which she would be assigned in time of war.

Power for lighting the vessel and for operating the searchlights, wireless and various other electric driven auxiliaries is generated by four 100 KW turbo-generator sets.

The propelling machinery, designed and constructed throughout by the builders, developed 100,000 shaft horsepower on trials, which is sufficient to drive the vessel through the seas at a speed of 35 knots or forty-one land miles per hour. This speed would take the vessel from New York to Liverpool in eighty hours as compared with about 120 hours required for the fastest passenger liner now afloat.

Describing briefly the main propelling machinery, the vessel is fitted with twelve oil-fired water-tube express type boilers, three being located in each of the four watertight compartments, and operated under forced draft. There are two watertight engine room compartments amidships in which are the powerful Curtis type marine steam turbines. These turbines operate at a speed of 2,500 revolutions per minute, which is reduced, through reduction gears on each of the four propeller shafts, to 400 revolutions per minute. The economy obtained in connection with the oil fuel consumption as compared with that of the older coal-burning installation, is remarkable.

At full speed the shaft horsepower developed is approximately three times as much as fitted to the recent battleships and oil fuel is consumed at the rate of 100,000 pounds per hour, which requires 624,000 cubic feet of air per minute to effect combustion.

The twelve express type boilers contain sixty-five miles of steel tubes, in which steam is generated at the rate of 1,500,000 pounds per hour at a pressure of 265 pounds per square inch. The main turbines are fitted with approximately 32,000 blades, some of which rotate at a speed of eight miles per minute.

Four main condensers, located in the engine rooms, require about 70,000,000 pounds of sea water per hour to condense the 1,200,000 pounds of exhaust steam from the main turbines.—*Boston Evening Transcript*, 29 May, 1923.

Proposed Building Program.—Washington, June 20.—Eight cruisers, four river gunboats and three cruiser submarines will comprise the building program which the Navy Department will present to the Budget Bureau and to Congress at the coming session.

Since the four-power naval treaty limits cruiser tonnage to 10,000 tons, the general board has been instructed to consider plans which will give the Navy the most efficient vessel of the cruiser type within this limitation, Secretary Denby said. It was expected, however, the eight new ships would follow closely the design of the *Detroit* class now in progress of delivery.

The four gunboats will be for the Chinese river patrol. Recent inspection of the old vessels now engaged in that patrol, Secretary Denby said, indicated that they must be replaced as quickly as possible.

The three cruiser submarines to be asked for are also in the hands of the planning section of the general board and no hint of the type which might be recommended has been made public.

Some surprises was evidenced in Navy circles because of the relatively small number of cruisers decided upon by Secretary Denby in view of his known opinion that the fleet is markedly deficient in this class. Considering cruisers less than ten years old, the United States, it was pointed out, would be represented in any international ratio by a "zero," while Great Britain has 214,000 tons and Japan 51,000. With vessels now building computed, the United States has 75,000 tons, Great Britain 249,000 and Japan 157,000.

Second only to the deficiencies of the Panama Canal defenses, the report upon this year's war games stressed the lack of fast scouts for the Navy. Mr. Denby's technical advisers were understood to have agreed that seventeen 10,000-ton cruisers would be necessary to maintain a 5-5 ratio with Japan and nineteen would be needed if a 5-3 ratio was to be sought.

The absence of any recommendation for destroyers in the program announced today was in line with the unanimous opinion of Navy experts that the United States was ahead of her logical ratio position in this class. It was suggested, however, that a small number of "destroyer leaders" would serve to give the fleet greater assurance of mobility in the face of concentrated submarine attack.

In the view of American naval strategists the destroyer has not been considered a substitute for the cruiser because of the inability of the smaller craft to maneuver in even moderate seas and their small offensive gun power and limited operating radius.

In submarines of less than 1,000 tons the United States is ahead of both Great Britain and Japan, but a majority of the American craft, notably the *S* boats, have never reached the operating efficiency which would permit their being considered for other than coast defense.

As to submarines of more than 1,000 tons, the United States has three built and three building, Great Britain nine in service and two building and Japan none in service and twenty-five building. After the World War all the first power admiralties agreed that naval submersibles should be of more than 1,000 tons in order to operate out of touch with their nearest base.—*Baltimore Sun*, 21 June, 1923.

Battleships to Be Sunk in Fall.—The old battleships *Virginia* and *New Jersey* will be sunk by the combined air forces of the Army and Navy off the Virginia Capes some time this fall. The tests will include every make of airplane now used by the two services and the torpedo plane will also be tested for its worth in war.—*The Naval Monthly*, June, 1923.

Naval Construction to Remain Suspended.—Regardless of the continued delay in final ratification of the Washington Conference Naval Treaty the United States will maintain its suspended naval construction program until the status of that agreement is definitely settled.

Announcement of the renewed decision to this effect was made today at the Navy Department in connection with the transfer to the War Department of ammunition originally designed for the main batteries of the seven battleships and four battle cruisers whose construction was stopped with the announcement of the 5-5-3 naval ratio agreement.

More than three score of the new 16-inch, fifty-caliber rifles were turned over to the War Department, after the conference, for installation in continental and insular coast defenses. When request for ammunition for these guns first came from the War Department, Secretary Denby and his advisers declined to comply until the conference treaties had been ratified or otherwise disposed of.

After further investigations, however, which included conference between President Harding and Secretary Denby relative to the Navy program, according to the announcement issued today, it was decided that it would be possible "to replace the ammunition prior to completion of the vessels for which it was intended should such action be necessary."

Cost of holding the navy's construction program in its present state of "suspended animation" has been unofficially estimated at $1,000,000 a month exclusive of claims of contractors growing out of abrogated contracts. In every case where a ship was laid down in a private yard the department is liable for demurrage on the space occupied as well as for storage on material.

Publicity, recently given to the practice in the Navy Department of stripping the navy vessels temporarily laid up under the naval treaty to equip other ships, has resulted in an order from the Bureau of Operations calling for a careful survey of such activity to prevent permanent injury to the de-commissioned ships.

Two thousand shells, 2,000,000 pounds of special powder and 8,000 "tanks" or containers were included in the stores turned over to the War Department. Most of them were held at the Dover, N. J., depot.

Part of the shells will be shipped to Hawaii, where several of the 16-inch rifles have been installed.—*New York Times*, 23 June, 1923.

JAPANESE TESTS OF OUR SINCERITY.—American professions of love for the square deal and equal rights to all are familiar to Japanese readers, note various newspapers in that language, but sometimes they find reasons to doubt the sincerity of such claims. One of these journals, the Osaka *Mainichi* hastens to help its colleagues with three tests by which it proposes to find out whether these well-known American protestations "come from the bottom of the heart." The first test, we are told, is the gun-range question; the second, the lawsuit regarding the California land legislation which is now claiming the attention of the United States Supreme Court; and the third test is America's attitude toward the League of Nations. According to the *Mainichi*, American naval officials "hold that the modernization of gun elevations does not violate the letter of the Washington Naval Treaty," and this daily asks:

"Do they mean that their country can do whatever she pleases so long as it does not contravene the letter of the Treaty, even though it is manifestly against the underlying spirit of the Treaty? America's modernization of her battleships would lead others to do the same, and this would lay America open to the charge that she has opened the way for a fresh naval race."

As to the second test proposed by the *Mainichi*, the California land law, it tells us that the Japanese are waiting with close interest to learn the decision which is to come from the United States Supreme Court. Meanwhile it declares that until the "obvious inequity" of this law is removed "Americans are hardly entitled to claim to be lovers of justice." The third test for America is entry into the League of Nations, on which subject this newspaper avers:

"America went the length of declaring war against Germany because of the latter's deliberate violation of treaty obligations. It is strange, therefore, that she makes no scruples about disregarding a treaty of her own making. It is selfishness on her part to refuse to bear the responsibility the Peace Treaty imposes upon her, while claiming to share in the benefits it confers. If she really loves justice, she ought to join the League of Nations as quickly as possible. A section of American statesmen are awakening to this necessity, but it remains to be seen whether the nation at large will support the entry."

Now in the matter of the Naval Treaty, Uncle Sam finds a stanch

defender of his policy in the Tokyo *Jiji*, which says that when it is remembered that misunderstandings between nations, and the exploitation of these misunderstandings by mischief-makers, are important causes of naval rivalry, it is obvious that "special care and circumspection must be exercised in all comments and criticisms of the naval programs of other countries." This Tokyo daily then points out that:

"America is to complete the construction of ten big cruisers of new type within the present year. Feeling that this program is inadequate for national defense purposes, she is reported to have decided to launch another scheme for the building of auxiliary craft next year. From the information available it seems certain that America proposes to start the construction of eight big cruisers (one report says ten cruisers) next year.

"What bearing has such a scheme on the five-five-three naval ratio fixed by the Washington agreement? Is it consistent with the spirit of the Washington decision? In our opinion, the American scheme is quite proper in the light of the naval ratio formally fixed. It might have been more in accord with the spirit of the Washington decision if America had had previous consultations with the other signatories of the Treaty in regard to her new building program, but purely from the point of view of preserving the officially fixed naval ratio we fail to see any impropriety in the American scheme of building eight or ten big cruisers.

"In regard to the construction of auxiliary craft no ratio agreement was reached at the Washington Conference, but there is ground for believing that tacit understanding was arrived at between the delegates of Britain, America and Japan that the ratio fixed in respect of the capital ships should be respected in laying down auxiliary craft construction schemes."

Such being the case, the *Jiji* goes on to say, all comments on the American plan "should take this understanding into due consideration." For many years America has neglected the replenishment of her cruisers, as noted by this journal, which reminds us that at the time America laid down her three-year program, she had no first cruisers, and we read:

"As compared with the cruiser strength of the Japanese Navy, the ratio is reversed, for Japan has a superiority over America by above seventy per cent in the number of cruisers and twenty per cent in displacement tonnage. Britain has five times the number of American cruisers and three and a half times the displacement tonnage of the American vessels. Such being the case, it is but proper that America plans to build eight or ten new big cruisers next year. In other words, we can take no reasonable exception to the American construction scheme so long as it does not upset the present cruiser strength of the British and the Japanese Navies.

"The question to be raised is whether this naval program will not be followed by still another building scheme, or how best the proportion of cruiser strength to that of destroyers and submarines can be fixed. As already stated, America is far inferior in cruiser strength, but in destroyers she is far superior even to the British Navy. This relative strength must also be taken into account in considering the American plan for building cruisers. If America's building plans after 1924 are left unknown to the outside world it is inevitable that all sorts of sinister misgivings will be aroused in foreign minds, and such suspicions and misunderstandings may lead to a fresh naval race, for naval competition arises mainly from misgiving. What is most important is that all the Powers concerned should put all their cards on the table and enter into frank consultation."—*Literary Digest*, 9 June, 1923.

MERCHANT MARINE

BOARD'S DISAPPOINTING BIDS.—In response to its advertisement for bids for its ships and vessel routes, the Shipping Board on Monday received

only twenty proposals of an unsatisfactory nature. Regarding the offers submitted Chairman Lasker gave out the following statement:

"The Board received about twenty communications, some containing definite bids, and others nebulous offers of negotiation. Of these twenty, four or five appear to offer possibilities, four more are in the twilight zone, and the remainder could not be seriously considered by any body of men under any circumstances.—*Nautical Gazette*, 2 June, 1923.

LASKER ADVISES U. S. OPERATION AS HE RETIRES.—The American flag is to be kept on the ocean trade routes by a new start under Government operation of shipping to give the United States second place among the maritime powers.

This is the program Albert D. Lasker proposes, on his retirement as chairman of the United States Shipping Board, for adoption in the event of anticipated Government failure to sell at an adequate price the lines it has offered for sale.

Determined to keep the flag on the merchant seas, the Government faces even more direct Government operation than the country has known since the beginning of wartime construction of Government shipping, because of refusal by Congress to indorse the subsidy policy; also because, Mr. Lasker disclosed today, the prospect is that most of the bids the Shipping Board recently asked will prove inadequate. Therefore, in the main, the Government will be forced to maintain the routes now being operated at its expense.

Only because of these conditions, Mr. Lasker advises the President, is the Government justified in assuming direct operation. But if efforts fail, as he expects, to obtain from private owners an adequate price for the ships he recommends a program to carry the Government into complete control and operation.

His program is not committed to permanent Government operation, but is a program to which the Administration is forced despite its continued denunciation of the policy of Government operation. Mr. Lasker points out that his plan will give the subsidiary Government fleet corporation control of the good will and terminal facilities "of" their respective routes, bringing to the lines a better sales value. He says specifically:

"Government operations should always be with a view to ultimate sale to private owners."

Under this plan the following would be the disposition of the ships now owned by the Government:

The twelve to eighteen routes into which the lines would be consolidated under subsidiary fleet corporations will require, to begin with, about 250 ships, replacing 400 now in these services. These 250 ships will represent about 2,000,000 deadweight tons.

About 200 ships, approximately 1,750,000 deadweight tons, would be selected as a reserve to be employed in highly competitive routes if foreign owners oppose expansion of American marine activities.

This total of 450 ships, supplemented by coastwise carrying capacity of 3,700,000 deadweight tons, "would provide this country with an aggregate merchant marine of approximately 7,500,000 deadweight tons, a nucleus for a balanced merchant marine, for service in peace and war and would place it in the second position among the maritime powers."

Some 900 to 1,000 surplus steel ships remaining should be sold to any buyers at the best price obtainable or scrapped if they cannot be sold, Mr. Lasker advises, because only elimination of this surplus tonnage will stabilize world shipping conditions, and this nation, seeking to promote an overseas merchant marine, desires stabilized conditions most of all.

Mr. Lasker sees the possibility of transferring from foreign fleets to our merchant marine supremacy in economic physical operation of ocean

freight carriers by refitting with Diesel engines part of the reserve 200 ships specified. He would place these refitted ships in the service of the dozen or eighteen operating companies recommended to be established under the Emergency Fleet Corporation, and says no further appropriation will be necessary for the refitting, if Congress permits use of the board's construction loan fund, "the effect of which will be such economies in operation as to permit of the restoration of the capital within a relatively brief period."

Chairman Lasker has understood that he would leave office this month. His successor, as has been announced, will be Edward P. Farley, of Chicago, one of the original Lasker men in the Shipping Board organization, who, until last August, was vice-president of the Fleet Operation in charge of sales.

The exhaustive accounting of his chairmanship, which Mr. Lasker made today to President Harding, falls into these two broad phases:

First—A financial accounting telling that bookkeeping order has been brought out of chaos and economies effected so that the Government, although still losing $4,000,000 a month on its shipping is making a huge saving compared with the deficiency of $16,000,000 a month before the present regime.

Second—Development of a program for the future showing the Administration's determination to keep a merchant marine afloat, even though it is forced to the extreme of continuing Government operation. Such operation President Harding, in messages to Congress, has called a "colossal failure," and a policy fundamentally wrong and practically impossible. And Mr. Lasker observes that it has inherent disadvantages and is justified only to maintain a merchant marine when the Government finds itself utterly unable to get out of the shipping business with anything like adequate return.

Mr. Lasker cites as achievements of his administration:

Settlement at less than twelve cents on the dollar of claims aggregating $150,000,000.

Reduction of a deficit of $16,000,000 a month to an average of $4,000,000 a month.

Treasury balance of $125,000,000 from liquidation, compared with a total cash reserve of $4,000,000 the day Mr. Lasker assumed office.

Restoration of confidence of world shippers in American shipping and creation of a service "at least comparable with that of any other merchant marine."

Turning from a review of administrative results, Mr. Lasker discusses what led to the proposal of the subsidy policy, and says:

"I firmly believe that the enactment of that bill would have brought about the profitable transfer of the Government ships to private ownership and the assurance of our economic independence in ocean transportation.

"The apparent alternative is to go the full length of direct government operation. My recommendation of this course would be only as an alternative. My conviction is that there are inherent in any form of government ownership of a merchant marine marked disadvantages as compared with private ownership which cannot be overcome, and this opinion has been emphasized every day of my tenure of office."

Mr. Lasker pays this tribute to President Harding:

"The two-year period which I undertook to serve having expired, I now tender you my formal resignation, effective June 12. In so doing I must express my appreciation of the splendid spirit which you have constantly given the board, of your self-sacrifice of larger, personal interests in our behalf, and of your vision of an American merchant marine which never failed to inspire and sustain us, and which alone brought order and progress out of chaos."—*Baltimore Sun*, 11 June, 1923.

GROWTH OF U. S. OVERSEA TRADE.—Trade statistics showing the volume of the commerce of the United States with the main trade regions of the world, have been compiled by the Transportation Division of the Bureau of Foreign and Domestic Commerce. The figures are given in long tons, and are therefore of practical value in determining the tonnage of cargo transported in foreign trade to and from the United States.

The figures show that the volume of export trade in 1920 was almost double that in 1914, while the import tonnage was more than fifty per cent greater than in the pre-war year. This increase in total imports is accounted for mainly by the enormous expansion in receipts from Mexico, the tonnage from that country and Yucatan constituting almost exactly fifty per cent of the total for all regions considered. Considerable expansion in trade with the United States has taken place also in the South American region. The volume of trade with the east and west coast of this continent reached a total of 9,211,000 long tons in 1920, as compared with 4,606,000 tons in 1914 and with 6,594,000 tons in 1918. The United States trade with Europe and the Mediterranean region in 1914 constituted slightly over three-fifths of our oversea exports and almost two-fifths of our imports. In 1920 this region took seventy-one per cent of the oversea exports, but contributed less than eight per cent of our oversea imports.

While statistics for 1918 have been included in these tables as a record of the volume of our trade during war time, they do not materially assist in determining the trend of our trade. Military requirements naturally came first in this year, so that normal trade relations throughout the world were materially modified.

The world-wide industrial depression in 1921 was reflected in the general decline in volume of United States oversea trade from the peak year of 1920, particularly in exports. In the West Indian, East and West Caribbean, West and South African, and Australian regions the tonnage of combined imports and exports in 1921 fell below the 1914 level by twenty-seven, twenty-nine, ten, and four per cent respectively. South American trade declined considerably, being lower than in either 1920 or 1918 but remaining above the pre-war total. The east coast of South America in 1921 took almost as much in tonnage as the whole of South America in 1914.—*Nauticus*, 26 May, 1923.

DURABILITY OF CONCRETE SHIPS.—Writing in *Nautilo*, the well-known Italian insurance paper, Lilio Nardi-Greco says that one of the chief objections raised by the opponents of concrete ships is the prejudicial effect of sea water on the concrete mass. This is evidently due to the chemical action of the magnesium sulphate contained in sea water on the calcium sulphate which exists in a high percentage in this material.

Exhaustive experiments have, however, proved that this drawback, which affects the porosity of the outer surface, can be obviated by carefully smoothing down the outside cover and by employing a polish containing a large proportion of china clay which combines with the liberated chalk. This method is now being generally adopted in the building of concrete ships, and promises to give them a life of almost unlimited duration; the iron is entirely protected from the action of the sea water, and the concrete mass acquires an increasing force of resistance with the course of time. The costs of upkeep are trifling.

As to the objection that concrete ships have an excessive displacement tonnage, it should be borne in mind that there has recently been built in an Italian shipyard a concrete motorship, the *Perseveranza*, which, with a carrying capacity of 3,000 tons shows a total displacement of only 4,700 tons, which gives a ratio of 0.64 to 1 as between the carrying capacity and the displacement. By way of comparison, it may be mentioned that a

steel ship of equal capacity gives a ratio of approximately 0.70, and the corresponding wooden ship of 0.60.—*Nautical Gazette*, 26 May, 1923.

"LEVIATHAN" TO DOCK AT PIER 86.—Dock Commissioner Delaney has granted to the United American Lines a temporary permit for the use of Pier 86 for the period of one year from May 1, 1923, at a rental of $300,000, with a proviso requiring it to allow the United States Lines berthing facilities. This arrangement will enable the *Leviathan*, the pride of the American merchant marine, to set sail from the New York side of the Hudson River.—*Nautical Gazette*, 2 June, 1923.

NECESSITY FOR TRIAL TRIPS OF PASSENGER LINERS.—The "million-dollar junket" of the *Leviathan* has directed a bombardment of criticism at Chairman Lasker, who is really more to be sympathized with than condemned. He is not deserving of condemnation for authorizing the trip, but he is in need of sympathy for the manner in which he has handled it. Before the giant liner enters the passenger service it is necessary to make certain that all her equipment is in good working order and that the crew is thoroughly trained in its duties. The only way in which this can be accomplished is by having the vessel run under conditions as nearly approximately those of actual service as possible. Furthermore, there are parallels which justify the trip from this standpoint. After completing her builder's trials successfully and coming up to requirements in every particular, the new Cunard liner *Franconia* sailed last week on a fifteen days' cruise with a large party of distinguished guests on board. This cruise was prior to her maiden voyage in the passenger service. A similar case is found in that of the new Lloyd Sabaudo liner *Conte Verde*. This vessel left the builder's yards a month or so ago and behaved as a good liner should on her trials. This, however, was not sufficient, and on a preliminary voyage from the Clyde to Genoa she was run under conditions closely imitating those of actual service. Her auxiliary machinery was kept in operation, lifts were operated, lighting and heating maintained, and all her other services kept going to afford a complete test under ordinary running conditions. Would these companies go to the expense of such trips if they were not necessary? Yet neither in England nor in Italy do the stockholders of these companies complain of million-dollar junkets. —*Nautical Gazette*, 16 June, 1923.

ENGINEERING

THIRTY-TWO HUNDRED POUNDS STEAM PRESSURE.—A few months ago we heard of a Swedish boiler designed for a steam pressure of 1,500 pounds per square inch. Now comes 3,200 pounds—this time from "conservative" England! This is sensational news, and as such will attract the man in the street as well as the engineer. But the engineer will not be content to sit in wonder at this latest marvel; he will immediately ask two questions: "Will it work?" and "Will it pay?"

The final answer to these questions can be given only after extensive practical experience with such pressures. What can be said now is that computations made by engineers experienced in power-plant design point to increasing commercial economy with increased pressures up to a point lying somewhere between 800 and 1,500 pounds. It is not generally claimed that anything will be gained by going beyond 1,500 pounds until it becomes feasible to raise the steam temperature well above 800 degrees F.

What, then, is the present justification for generating steam at 3,200 pounds, as is done in the Benson system described in this issue? The answer given is that it is easier and safer to generate steam at 3,200 pounds than at 1,500 pounds. This claim seems to accord with what is

known about the properties of steam at extremely high pressures. It is well established that water has a "critical point" in the neighborhood of 3,200 pounds pressure and 706 degrees F., and that at this point the fluid slips quietly, and in mass, from the liquid to the vapor state without ebullition (boiling or bubbling). For this reason priming difficulties which normally increase when the pressure goes up, may be expected to disappear at the critical point. This in turn should make it feasible to eliminate all large drums and generate the steam in coils of small-bore tubes such as can easily be built to withstand the critical pressure and temperature. The steam having thus been generated without difficulty at the critical point, could easily be throttled down to any desired working pressure. In the case of the experimental Benson plant this pressure will be 1,500 pounds at the turbine inlet.

It is evident that the theoretical efficiency of such a plant is exactly the same as if the steam had been originally generated at 1,500 pounds. The commercial success of the Benson steam generator must therefore hang on the proposition that steam for high-pressure plant can be most safely and cheaply generated at the critical pressure. The completion and testing of the 1,000-kilowatt experimental plant in the works of the English Electric Company at Rugby will be awaited with keen interest by all engineers interested in the generation and utilization of high-pressure steam.—*Power,* 22 May, 1923.

Welding of Nickel and Alloys.—A recent invention referred to in the *Acetylene and Welding Journal,* relates to a process for the autogenous welding of nickel and alloys containing a high percentage of nickel. Up to the present, the welding of this metal and alloys with high nickel content has been found to be impracticable, owing mainly to the occlusion of gases during the welding operation. According to the invention, occlusion is prevented, and a satisfactory weld produced, by welding and subsequently cooling the nickel or alloy in the presence of carbon or a carbonaceous material or compound, which, when heated to a high temperature during the welding process, produces a reducing atmosphere of a higher power of occlusion than the metal itself, and therefore during cooling occludes the deleterious gases which would be occluded by the nickel or nickel alloy. The atmosphere maintained around the metal during cooling is, as a result of the occlusion by the carbon, inert.—*The Engineer,* 1 June, 1923.

Mechanical Stoker.—The Dutch Royal Packet Company, which owns over 100 vessels, has fitted mechanical stokers to two of its ships, the S. S. *Bintoeham* and S. S. *Parigi,* both of which have water-tube boilers. The installations were first tested in European waters before the vessels proceeded to the Far East where they are now trading. According to the report of the chief engineer of the company, the mechanical stokers have reduced the coal bill ten per cent to fifteen per cent, as compared with sister ships hand-fired, and give almost smokeless combustion a mere "Wisp" of smoke when going at full speed, with an average of eleven per cent. CO_2 as given by a CO_2 indicator. Another great advantage claimed for mechanical stoking is that the steam pressure is maintained practically constant throughout, and equal in this respect to oil fuel. With hand-firing the furnaces have to be cleaned out every watch, so that there is invariably a considerable drop in the steam pressure, and, of course, in efficiency as well. A mechanical stoker, with the firedoors practically always closed, and a continuous feed of coal with an almost continuous discharge of ash and clinker, is, of course, bound to be an enormous improvement in this respect. Even with exceptionally bad "clinkering" coal as often used in the East, the clinker can be removed

by hand through the firedoors without difficulty and without any diminution in the steam pressure. Finally, the introduction of mechanical stoking means a complete revolution in the labor conditions of the stokehold, which become also equal in this respect to those obtaining with oil-firing. The type of mechanical stoker used in the Dutch vessel has a hopper in front of the boiler.—*Nauticus*, 10 February, 1923.

Oil Tanker Discharge.—The discharging and loading of tank steamers has hitherto been effected through the medium of rubber or metallic hose, a somewhat tedious and expensive operation.

Recognizing the difficulties in this connection, Messrs. Gwynne's Engineering Company, Ltd., of Hammersmith, London, have given considerable thought and attention to the subject, and are today placing on the market an all-steel flexible pipe line.

The scheme is simplicity itself and consists of two weldless drawn-steel pipes connected to swivelling joints to provide for all the movements it is possible for a ship to make relative to a fixed point thus preventing any possibility of strain or breakage.

In the diagram is shown the main discharge pipe across the deck, leading into a ball-and-socket joint supported by a bracket; the function of this joint being to provide for roll of the ship in all directions. Coupled to this is a swivelling joint with a divided pipe and tee-piece suitably packed to prevent oil leakage. To the flange of the tee-piece a length of steel pipe is bolted, and at the apex of the triangle is another divided joint. A further pipe connecting the fixed joint on the jetty completes the scheme, the latter joint being so constructed that it will provide vertical movement, or will rotate to allow fore and aft movement of the ship.

The claims put forward in favor of this equipment are that discharge or loading pressure can be increased, maintenance costs reduced, and there is considerably less likelihood of pollution of dock waters.

While no one can doubt the usefulness of hose in many instances, it is an accepted fact that pressure exceeding 100 lbs. per square inch cannot safely be employed when they are used for oil discharge work. In the scheme under review it is claimed that it is practicable, if desired, to pump at 200 lbs. per square inch without risk of fracture. This claim alone can be extended to illustrate the savings to be effected by shortening the period of actual discharge with a consequent reduction of dock dues and overhead charges while the ship is lying idle during unloading.

Maintenance cost of hose is a factor which varies considerably according to the conditions under which oil bunkering is done, but, generally speaking, most oil importers have heavy charges to meet in this respect and the percentage of bursts and replacements necessary are considerable.

The question of "pollution of navigable waters" has been, as is well known, the subject of recent legislation and any equipment which will minimize the risk of any such pollution taking place is bound to receive the serious consideration of all who are in any way concerned with the handling of oil in our ports. In the Gwynne pipe-line bursts are a remote possibility, owing to the steel construction, so that at least one probable source of pollution is eliminated, to say nothing of the loss of valuable fluid.

It will be obvious that the equipment described is equally suitable for all pipe-line connections between ship and shore, and in sizes of 3-inches and upwards it is put forward as a means of conveying steam to the ship from the boiler ashore where inflammable oils are being discharged and the fire risk is present. In such instances the danger of burst steam connections with men working near cannot be overworked, apart from any consideration of efficiency.

DISCUSSION OF ANTI-FOULING COMPOSITION.—Makers of anti-fouling compositions will find a good deal to interest them in the discussion which took place recently at the North East Coast Institution of Engineers and Shipbuilders on Mr. G. S. Baker's paper dealing with measured mile trials and other ship propulsion data. Rear Admiral D. W. Taylor, who was until the other day a distinguished member of the Construction Corps of the United States Navy, expresses the opinion that a major factor accounting for the differences between the results obtained with models and those obtained in service with full-sized ships is the increased resistance due to fouling. It is, he says, a most erratic factor, and it is hardly practicable to reduce it to rule. In 1915 Captain McEntee published results of tests of friction of twelve plates that were submerged at a point in the Chesapeake Bay, near the U. S. Navy Yard at Norfolk, Va., and removed one by one at intervals of a month and tested for frictional resistance. After a year's submergence, the friction was four times as great as when clean, but the increase was more rapid in the early months. In four months the increase was 175 per cent of the original, or at the rate of nearly one and a half per cent per day of submergence. The fouling is, of course, Admiral Taylor adds, materially affected by the time of year and location.

Mr. Edwin R. Mumford (Messrs. William Denny and Bros., Dumbarton) regards the condition of the bottom surface of a ship as a very important consideration, not only on account of actual fouling due to slime or marine growth, but also on account of occasional improper treatment of a newly painted bottom surface. It has frequently been found, he says, that if a vessel be undocked before her newly painted bottom surface has become dry and hard, a low propulsion efficiency is obtained. Sometimes the condition of the paint surface is so soft that the scour of the water tears it in such a manner as to increase considerably the resistance of the hull. Further scouring may remove some of the roughened paint surface, when the resistance becomes correspondingly reduced. An interesting example given by Mr. Mumford shows how the i.h.p. of a clean-painted ship was reduced six and one-half per cent (equivalent to a gain of a quarter of a knot) in two days. Considerations of time and cost have frequently, Mr. Mumford says, compelled premature undocking in our damp climate, but, in his opinion, the penalty should be better known, as it is inevitable.

In his contribution Rear Admiral Taylor recalls comments on the subject made in another discussion by Sir Archibald Denny. At Dumbarton they had found, Sir Archibald said, that fouling which did not exhibit any visible growth was also prejudicial. After launching, the vessels built by Messrs. Denny lay in brackish water in the fitting-out basin, and it was the firm's practice, as often as possible, to run a preliminary trial before docking and a complete set of progressive trials after docking when, frequently, they got an increase in speed of half or even three-quarters of a knot. Examining the bottoms in dock, they found no apparent fouling; indeed, the surface seemed exceedingly smooth and even slippery. By repeated comparisons before and after docking, they had got a figure for the effect of this fouling, namely, that for each day a vessel lay in the fitting-out basin the skin-friction resistance increased at the rate of nearly one half per cent per day, and that they had found to be true for periods as long as three months. According to Admiral Taylor, experience with U. S. naval vessels confirms Sir Archibald's testimony not only as regards the material increase of resistance with fouling, but also as regards appreciable increase with little or no growth.

Dealing, in his reply, with this particular point, Mr. Baker says that it is quite true that fouling takes place very rapidly in confined waters into which refuse may find its way, and Captain McEntee's experiments on foul-

ing of plates not moving through the water are most illuminating in this respect. Similar experiments with raft models were made in Portsmouth Harbor by Mr. R. E. Froude about 1902, showing equally serious growth. The results of these experiments have never been published. There is, however, Mr. Baker goes on to say, a considerable difference between such fouling and that which takes place on a ship in motion—at least, in the rate at which the fouling increases. Two other points are made anew by Mr. Baker—points which were originally made by him at Newcastle in 1915. One is the incorrectness of assuming that results for model hold for ship, as the roughness represented by a given stage of fouling—say, one-inch weed—means 24-inch weed on the ship—an unforgivable amount. The other point relates to the location of the roughness on the ship. A clean bow is, he says, far more important than a clean stern.—*London Engineering.*

AERONAUTICS

PORTABLE MOORING MAST FOR AIRSHIPS.—A portable rigid airship mooring mast which may be used extensively in advance base operations by naval airships and which would also have great value in connection with the commercial operation of airships is being developed by the Navy Department.

Preliminary design of the portable mast has been completed and if further development proceeds as favorably as at present, it is probable that several will be constructed for use in connection with the extended flights of the *ZR1.*

The mast as designed is about 115 ft. high as compared with 165 ft. for the permanent mast at the Naval Air Station, Lakehurst. The portable mast, however, is intended to be set up with a minimum of labor and possibly to remain set up for a comparatively short space of time. Consequently the lower height of the mast would be an advantage, although it requires a little more careful handling of the ship while at the mast. The plans provide for an extremely simple structure. It is intended that as great a use as possible shall be made of the facilities afforded by the locality in which the mast may be set up and no extensive foundation or anchorage of concrete will be required.

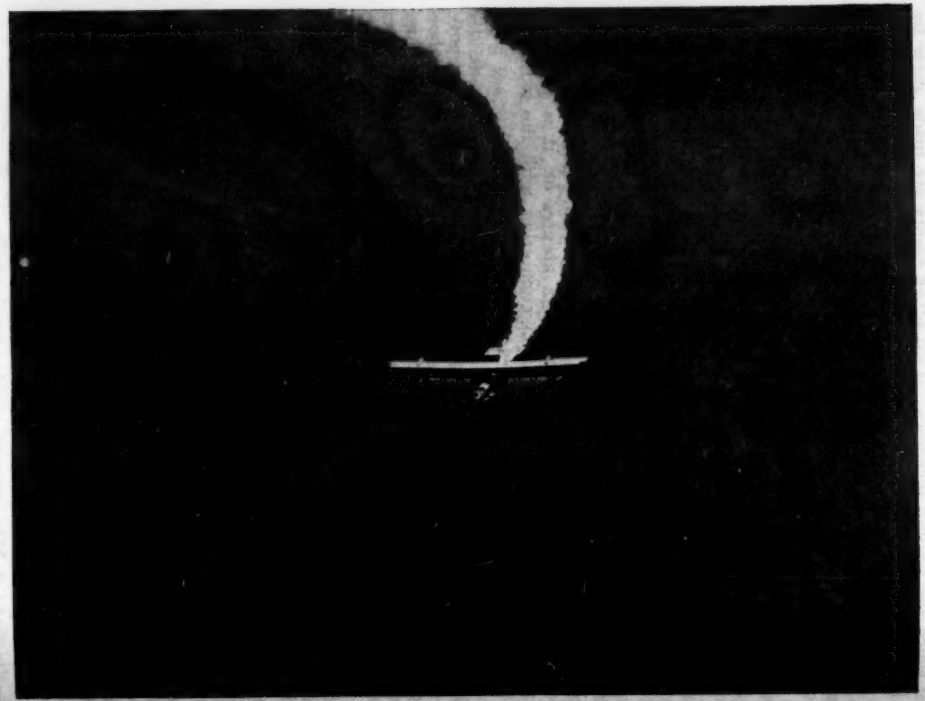
The value of the portable mast to airship operations far removed from a permanent base is obvious.—*Aviation,* 21 May, 1923.

A HUGE AIRPLANE.—Construction of an airplane with a radius of 2,000 to 3,000 miles, carrying twenty passengers and able to go from New York to Peking in approximately 65 hours with only four stops soon will be a reality, according to Brig. Gen. William Mitchell, Assistant Chief of Air Service, addressing the Lions club at Washington, D. C., on May 8.

General Mitchell said a plane was being built having a span of 125 ft., 30 ft. high, having three engines on each wing and requiring eleven men to navigate it and burning approximately 1,000 lb. of fuel an hour. With this plane a trip across the continent could be made in daylight without any stops.—*Aviation,* 21 May, 1923.

TEST OF 4,000 POUND BOMB.—The newest and most deadly weapon of destruction employed by the Army Air Service, in the shape of a 4,000-pound "demolition" bomb, was placed on exhibition here today.

This bomb, described as the largest in the world, weighs actually 4,300 pounds, of which approximately 2,000 pounds is TNT. When tested the bomb caused an explosion which threw a dense cloud of earth to a height of more than 1,000 feet, leaving a crater 64 feet in diameter, with a depth



Official Photograph, U. S. Navy

NAVAL SCOUT PLANE LAYING SMOKE SCREEN

of 19 feet below the original level, and a rim about five feet high. The volume displaced was more than 1,000 cubic yards.

The new bomb is designed to be discharged from a special rack on a Handley-Page bombing plane.—*Baltimore Sun*, 5 June, 1923.

Loss of the "TC-1."—The United States Army service dirigible *TC-1*, was destroyed by fire shortly after it moored at Wilbur Wright Field at six o'clock here last night. The ship, the largest of its kind in this country, was destroyed during a severe electrical storm. It came to Dayton late yesterday from Scott Field, Illinois, on a test flight.

The ship had been moored to one of the steel towers when it was caught in the wind and swung around, coming in contact with another steel post. The bag was highly charged with electricity and the connection with the two steel towers caused the explosion and fire, it is believed.

The *TC-1* was of the same size as the *C-2* which was destroyed by fire at San Antonio, Texas, last year, after completing a trans-continental flight. The *TC-1* finished its trial test flight over Scott Field on April 7 and was accepted by the Government.

There was one flash accompanied by a loud noise and the ship was destroyed.—*Boston Evening Transcript*, 7 June, 1923.

European Air Lines Show Rapid Growth.—The extent to which commercial aviation is developing in Europe is indicated by the following complete list of lines now in operation, and which has just been submitted to the League of Nations.

The aerial lines operating in Europe at the middle of May were:

London-Paris, with extension soon to Basle.
London-Brusselles-Cologne.
Manchester-London-Rotterdam-Berlin.
Paris-Strasbourg-Prague-Warsaw.
Prague-Vienna-Budapest.
Bucharest-Constantinople.
Antibes-Ajaccio.
Toulouse-Barcelona-Alicante-Malaga-Rabat-Casablanca.
Hamburg-Copenhagen.
Berlin-Koenigsberg-Smplensk-Moscow.

Other lines, for which negotiations are practically finished are:

Geneva-Zurich-Berlin.
Berlin-Prague.
Milan-Rome-Brindisi.
Ajaccio-Tunis.

Besides regular passenger and express service, the majority of these lines make regular postal connections.

The Milan-Rome-Brindisi line for example will connect up with northern European mail coming down by way of the Simplon and Gothard passes and will hook up at Brindisi with the steamer mails for the Orient.—*Baltimore Evening Sun*, 30 May, 1922.

Army and Navy Aviation Questions.—The joint Army and Navy board is considering two important questions, involving possessions and functions of the Army air services and the Navy aviation branch. One has to do with the acquisition of the German *ZR-3*, under construction in that country in accordance with the reparations agreement. The assignment made contemplates the possession of this property by the Navy, to be quartered at Lakehurst, N. J., while the military authorities are desirous of acquiring it. The claims of each branch have been presented, with arguments to show the necessity for a settlement of the controversy. The possession of the German rigid is regarded by the Army air service people

as essential to the development of the efficiency of personnel, to say nothing of the desire in that quarter for acquiring several additional lighter-than-air craft of this type. The other question is one of more importance and greater effect, having to do with the determination of the respective functions and field of aerial operations of the Army and Navy aviation branches. During the war an informal agreement or "understanding" that did not reach the solemnity of an obligation reduced to documentary shape prevailed under which the Army aviation covered, and confined its operations to, the land; while to the naval aviators were assigned the flights over the sea. It appeared to be the most convenient arrangement imaginable, although there were instances, it is asserted, when the naval authorities in Europe sought to have the naval flyers operate on the western front in company with the Army air personnel. Now, as has been explained in these columns, the issue has been somewhat acutely precipitated by those who are anxious to have the line of demarkation sharply drawn for guidance hereafter and to leave nothing to future conjecture or controversy, by which means it is hoped to ascertain finally and conclusively just where the Army aviators shall be responsible in their flights and, by the same token, exactly where the naval flyers will find their field of operations. The principal point involved appears to relate to the seaboard and off the coast. The situation, with the differences of opinion entertained and the difficulties of adjustment, will probably be urged by advocates of a consolidated air service as an example of the efficacious results of amalgamation and centralized control.—*Army and Navy Register*, 16 June, 1923.

THE HELICOPTER COMPETITION.—A study of the conditions laid down by the Air Ministry for its £50,000 helicopter competition leaves one almost breathless with wonderment at the apparent faith, displayed by those responsible for drawing up the requirements, in the probable development of the helicopter during the next twelve months. Indeed, but for one fact, namely, that if the prizes of any of them are not won next year they are to be re-offered for competition during the ensuing twelve months, we might be tempted to come to the conclusion that the conditions have been made so stiff as deliberately to prohibit their fulfilment. Judged by the value of the prizes to be awarded, the qualities required of the helicopter by the Air Ministry are in ascending order of importance: first, ability to rise off the ground; secondly, ability to descend safely with the engine shut off; thirdly, ability to hover above a prescribed point; and fourthly, ability to maintain itself in the air at a given height and fly horizontally thereat over a stated distance at a prescribed speed. For the fulfilment of these tests the prizes to be awarded are respectively five, ten, fifteen, and twenty thousand pounds. These prizes are certainly generous, and as for the tests few will quarrel with their nature and the order of importance in which they are arranged, although some may criticize the omission of all reference to fuel consumption. When, however, we examine the numerical conditions attached to the requirements and compare them with the actual performances so far achieved with existing designs of helicopters, we are left with an impression—a wrong one, no doubt—that the competition, at least for the next year or two, is not meant to be taken very seriously. For the first test the Ministry requires that a competing machine with pilot, fuel for an hour, and 150lb. of military load, shall, in a ground wind of between ten and twenty miles an hour, ascend vertically to a height of 2,000ft. and descend and land without damage. For the second test the machine is to be maneuvered over a given point and then to descend from a height of 500ft. with the engine shut off and alight within a hundred feet of the given position. For the third test it has to hover at 2,000ft. for half an hour over a prescribed area, while for the fourth it has to

fly at that altitude over a given closed circuit of not less than twenty miles at an air speed of sixty miles an hour or more.

Within the past fortnight MM. Oehmichen and Pescara, both of whom have been studying and experimenting with helicopters for several years, have established, in France, various records in the way of helicopter flight. M. Oehmichen, an early example of whose machine was illustrated and described in our issue of April 15, 1921, succeeded in hovering for five minutes over one spot and just clear of the ground and in flying in a circle of 400ft. diameter. M. Pescara has described a circle of 130ft. diameter at a height varying from 20in. to 36in. above the ground, and has flown in a straight line a distance of 190ft. From America it is reported that the de Bothezat helicopter has left the ground with four persons on board, but for how long it remained up and how many inches it ascended to we are not told. These performances, compared with the Air Ministry's requirements, are as the first hops with the early power-driven aeroplane to the aeronautics of today. That there is the same probablity of ultimate success is much more than doubtful, for the helicopter idea is at least as old as the aeroplane and is still in the embryo stage. Unless developments are proceeding of which we are in ignorance—in this connection it may be said that Mr. Louis Brennan's helicopter, constructed with great secrecy at Farnborough, is by a special clause in the conditions expressly excluded from the competition—it seems quite unreasonable to expect that by April next year the Ministry will receive any entries of machines having prospects of being able to satisfy the required conditions. Although the theory of helicopter flight has now been fairly well established, the practical and constructional difficulties in the way of giving it effect are enormous. If the assistance of fixed supporting plane surfaces is dispensed with, the problem of heavier-than-air flight is reduced to the basis of that set himself by a man who chooses to carry a load of earth in a bag over his shoulder instead of transporting it in a wheelbarrow. In an aeroplane the net thrust developed at the propeller may be taken as approximately one-tenth of the total weight of the machine when the speed is sixty miles an hour, and as about one-quarter at 100 miles. In the case of a helicopter, however, the sustaining screws must at all times develop a net thrust equal to the total weight of the machine, and, in addition, they or other screws must be capable of developing the extra thrust required for horizontal flight. The first practical difficulty encountered is therefore that involved in having to use an engine of much higher power and greater weight than is necessary in an aeroplane developing the same lift. This penalty is inherent in the very principle of the helicopter and cannot be avoided. A less fundamental difficulty, yet one which so far has given perhaps chief trouble in the practical design of helicopters, is the devising of a satisfactory method of transmitting the power from the engine to the sustaining screws. It is obvious that unless one large central screw is used—an idea which has now been practically abandoned—all the complications of the power system in a multiple-screw aeroplane, complications which are only now being satisfactorily solved, have to be faced in the helicopter from the very start. On this score it is perhaps worth noting that while the helicopter clearly calls for an engine especially for itself and differing radically from the present highly developed aeroplane engine, no such power plant is today commercially available, nor it may be supposed will one be produced until the helicopter has definitely established its position as a practical and desirable means of flight. The helicopter designer has thus for the present either to adopt a makeshift type of engine or face the formidable task of designing and constructing an appropriate one for himself. The problems of securing horizontal flight without propellers other than those used for sustentation and of regulating the speed of descent when the engine is shut off are too big to be more than mentioned here.

It is sufficient to say that while they are theoretically capable of solution, the steps taken toward their practical realization so far as they have been disclosed do not up to the present afford much ground for believing that within a year it will be possible to fly horizontally at sixty miles an hour or to descend safely, with the engine shut off, from a height of 500ft. If, on the other hand, reliance is placed on separate propellers for horizontal movement and on the regulation of descent by the application of power to the sustaining screws, there will be, on the one hand, a great increase in the complications of the power driven, and, on the other, a risk of immediate disaster in the event of engine failure.—*The Engineer,* 18 May, 1923.

ORDNANCE

AN ANALYSIS OF BATTLESHIP GUN RANGES.—An obviously garbled version of Mr. Amery's speech in the House of Commons on May 1 has provided naval enthusiasts at Washington with more ammunition for the furtherance of their campaign. In a summary of the speech cabled to the American Press the First Lord was made to declare that "command of all the seas" was still the root principle of British naval policy, but a careful reading of Mr. Amery's remarks fails to disclose any such passage, or, indeed, any passage which could be interpreted in that sense. In explaining the strategic mission of the British Navy and the importance of endowing it with world-wide mobility he said: "It is only if we have an oil station base within the operating range of the fleet, which is not much more than 2,000 miles, that we can make the Navy free to work across the seas of the world. In all those (Pacific) waters, with such immense consequences to this country from a strategical point of view and for the defense of the Empire, we are absolutely helpless and reliant upon the goodwill of a friendly and former Allied Power. It has always been the contention of the Admiralty that the fleet should be free to go wherever a potential enemy might go. The action now taken (in connection with the Singapore base) simply aims at securing for the fleet, now very much reduced, free mobility, so that it may carry out in every sea of the world its historic mission, which is to keep the seas free for the trade of this country, and for communications between this country and the other portions of the Empire on which, in peace as well as in war, our security and existence depend."

This is the speech which, according to a Washington dispatch, "is interpreted by United States Navy officials as a virtual abandonment of the policy of Great Britain, announced by Lord Balfour at the Washington Disarmament Conference, of accepting naval equality with the United States." The message goes on to say that amazement was expressed by high American naval officers that the First Lord of the Admiralty had made such a statement. "That 'command of all the seas' has been the British naval policy for a long time is generally asserted by American naval officers who are thrown more or less in contact with British officers. Coming as it does immediately after Secretary of the Navy Denby had formally announced that the work of elevating our guns would be delayed until after Congress has had another opportunity to examine the situation, Mr. Amery's declaration caused not a little surprise in Administration circles. 'We are tickled to death; they are playing right into our hands,' was the remark of one official who is keenly interested in seeing that what is left of the American Navy be made 100 per cent efficient."

This is not the first time that the aims of British naval policy have been misrepresented to the American public by inaccurate news from London, but the present instance is a particularly flagrant one, calculated as it is to throw suspicion on the bona fides of the British Government in regard to a highly-important international covenant. Nevertheless, the suggestion that

high American naval officers seriously believe this country to have repudiated the principle of equality of sea power and reverted to the old doctrine of supremacy in all seas can be dismissed without hesitation. Actions speak louder than words, and none know better than officials of the Navy Department how thoroughly Great Britain has carried out her pledges under the limitation treaty. The writer of the dispatch quoted above gleefully surmises that this new British claim to command "all the seas" will "do more to convince Congress that the big guns of the American Fleet should be elevated to give them greater range than any amount of argument." But if precedent is followed Congress will probably insist on having an authenticated report of what Mr. Amery said before it takes action. Members will not have forgotten that a large sum of money was appropriated last December for naval improvements on the strength of intelligence which subsequently proved to be erroneous.

In a previous reference to the elevation angle of big guns in the United States Navy it was stated that only three ships, *Colorado, Maryland,* and *West Virginia,* had a maximum elevation of thirty degrees. It appears, however, that at least two other ships, the *California* and *Tennessee,* are able to fire their main armament at this elevation. Mr. S. V. Goodall, R. C. N. C. who read a paper on American warship practice at Portsmouth on January 31, 1922, mentioned that "in the *Tennessee* the maximum angle of elevation is thirty degrees," and as the *California* is a sister ship it is reasonable to infer that the same remark applied to her also. As these vessels are armed with the 14-inch 50cal. gun, their extreme range at thirty degrees must surely be well over 30,000 yards. Consequently the American Fleet includes five ships which can open fire at a range exceeding 30,000 yards, whereas in the whole of the British Fleet there is only one ship, the *Hood,* whose guns possess this ranging power. All other British ships are limited in range from 24,300 to 23,800 yards, according to whether they carry 15-inch or 13.5-inch guns.

In the American post-treaty fleet there are two ships, *Utah* and *Florida,* with 12-inch 45cal. guns, whose range at fifteen degrees is 22,000 yards. Next come two ships, *Arkansas* and *Wyoming,* carrying 12-inch 50cal. guns, which at fifteen degrees can shoot up to 24,500 yards. Then there are six ships—*New York, Texas, Oklahoma, Nevada, Pennsylvania, Arizona*—with the 14-inch 45cal. gun, credited at fifteen degrees with a range of only 21,000 yards, thanks to its lower muzzle velocity (2,600f.s. as against 2,950 and 2,850f.s. for the 12-inch 50 and 45cal. marks respectively). The 14-inch 50cal. gun is mounted in five ships—*New Mexico, Idaho, Mississippi, California* and *Tennessee*—but the first three presumably have only fifteen degrees of elevation. The range of this gun at fifteen degrees is not stated in the official return circulated to Parliament on May 2, but in view of its high M.V. (2,800f.s.) it should be good for not less than 24,000 yards. Assuming this to be so, the comparative range of guns in the British and United States battle fleets can be tabulated as follows:

GREAT BRITAIN	UNITED STATES
1 ship *(Hood)* max. range 30,300 yards.	3 ships *(Marylands)* max. range 34,500 yards.
12 ships (*Queen Elizabeth, Royal Sovereign,* and *Renown* classes) 24,300 yards.	2 ships *(Californias)* max. range 30,000 yards.
9 ships (*Iron Duke, King George V.,* and *Tiger* classes) 23,800 yards.	3 ships (*New Mexico* class) max. range 24,000 yards.
	6 ships (*Texas, Nevada, Pennsylvania* classes) max. range 21,000 yards.

2 ships (*Arkansas* class) max. range 24,500 yards.
2 ships (*Utah* class) max. range 22,000 yards.

The disparity in the ranging power of the two fleets, such as it is, arises chiefly from the inclusion of six American vessels armed with the relatively low-powered 14-inch 45cal. gun. It is, however, interesting to note that the average range for the eighteen American ships is 25,250 yards, while the average for the twenty-two British ships is 24,367 yards. On the basis of the foregoing analysis of ranging power it is doubtful whether a "Kriegspiel" exercise in which the two fleets were opposed would reveal any marked tactical advantage on the British side. At any range above 25,000 yards the British Fleet would be hopelessly outclassed, at it would then be under fire from forty-eight guns, to which it could oppose but eight. On the other hand, it could develop a superior volume of fire at ranges between 25,000 and 21,500 yards, as twenty-two of its ships would then be in action against only twelve American. This disparity doubtless justifies the American case for increasing the elevation of their 14-inch 45cal. guns, but it is by no means so pronounced as Congress was led to believe when the Modernization Bill was substituted to it. Moreover, the strongest argument advanced on behalf of this measure was the supposed superiority of the British Fleet at extreme ranges, whereas, in fact, this superiority is proved to be already enjoyed by the American Fleet.—Hector C. Bywater in *Naval and Military Record*, 30 May, 1923.

A NEW AUTOMATIC CANNON.—Demonstrations were made on May 28-29 at Aberdeen Proving Ground, Md., of an automatic cannon, designed by John M. Browning, inventor of the caliber .30 and caliber .50 Browning machine guns. The new piece is of 37 mm. (about 1½-inch) caliber, and the weight of the projectile is about 1¼ pounds. The firings of the piece were conducted by representatives of Mr. Browning and of the manufacturer, the Colt's Patent Fire Arms Company, and they were witnessed by a number of Army and Navy officers and others. In the development of automatic firearms the present piece represents an advance from the caliber .50 machine gun to an arm capable of firing automatically projectiles of one inch greater caliber. It is considered at present as more or less in the experimental stage, yet the demonstrations at Aberdeen were so successful that it is considered practically certain that an arm capable of firing automatically 1½-inch projectiles will be produced that will meet the service requirements. Such an arm probably will be used, among other places, in aircraft and in the anti-aircraft armament of fixed defenses.—*Army and Navy Register*, 2 June, 1923.

NAVIGATION AND RADIO

FIGHTING AIRCRAFT WITH RADIO.—A method devised by German scientists for putting out of commission any motor using electric ignition, by stopping its magneto with radio, is announced by the daily press. The Los Angeles *Times*, however, says that Southern California experts claim that they are able to outwit the German inventors. This is already possible in two ways, they tell us. While the German use of radio waves of unusual potency will undoubtedly put the Liberty and other internal combustion motors out of action, other forms of motors have been developed which can not be so affected. We read:

"The success of the Siemens-Stinnes experts in Germany may stimulate especially American use of the steam turbine engine for aircraft, according to local airplane motor experts. This type, and the heavy-oil burning

engine, such as the Diesel, will not be touched by the German development.

"The turbine has already been developed for actual use in airplanes. Harry Peters of La Crescenta, widely known aviation motor expert of England, whose health sent him to Southern California after the war, made flights in a turbine-equipped airplane before leaving England.

"A turbine engine for airplanes and automobiles has been developed at San Diego by John T. Waugh and Captain B. H. Taylor, and, according to local airplane experts who have witnessed its operation, it works successfully, and has a much lighter weight per horsepower than the aircraft gasoline engine.

"E. M. Fisk and R. S. Gradle, officers of the Commercial Aircraft Association, believe that engines burning heavy oil can be made feasible for aircraft, and that these will be made in America in the near future.

"'The method reported in the *Times* cablegram has been suspected as having been developed for some time,' said Bennett Harrison, of the Radio Service Company's staff yesterday. 'It is feasible, for it puts the magneto out of commission and so stops any motor with electric ignition. It is surprising that the Germans conducted their experiments where the French investigators could learn of them, for their efficiency is now greatly affected.

"'Experts of all nations will begin to search for means of counteracting the radio attack by developing motors which will not be subject to radio. France and England, whose main defense in future must be aircraft, are either forced to develop defensive radio control or scrap a great amount of their newly built equipment in engines.

"'Radio control and interference will be enormous factors if we have another war. The influence of radio will be everywhere. Great stations like KHJ of the *Times* will have a great patriotic part, for they will reach millions on the instant and arouse and organize as was not possible in the campaigns of the past war. They will also warn an enemy of the temper of the American people.

"'These stations should be considered by the Government as actually being powerful aids to defense and methods developed to protect them against any aerial interference in case of war. If possible, an enemy will cut them off from the air as surely as he would cut a cable. The possibility of this is suggested by the report from Paris on the radio interference with aircraft motors.'"—*Literary Digest*, 16 June, 1923.

Radio Device Makes Talk Private.—One problem of radio telephony, privacy of conversations, has been solved by engineers of the Bell system, according to announcement yesterday by the American Telephone and Telegraph Company, which reported that the invention was working successfully over a thirty-mile stretch of ocean between Los Angeles and Catalina Island.

"The Catalina Island radio link is the first to be equipped with the wireless telephone privacy system recently developed by the engineers of the Bell System. Heretofore talks over the Catalina Island link have been 'picked up' by amateur receiving stations in the region. The talker could not tell how far afield his words might go. The privacy system was designed to remedy this. It is not claimed that the new system is absolutely secret, but at least privacy has been obtained, so that no one will inadvertently overhear the conversations which are transmitted.

"The new radio equipment, before putting the messages on the air, will distort or 'scramble' them, and no receiving set which is not specially designed or manipulated to 'unscramble' them can obtain anything intelligible. While anyone familiar with the system, and possibly an ingenious person not familiar with it, might devise a set which could listen to the system, such a set would be much more complicated than the

ordinary set, and the added complication would be of no value except for picking up transmission over this system. It is, therefore, not likely that many people will try it."—*New York Times,* 10 June, 1923.

FRANCE FORGING AHEAD IN WORLD-WIDE RADIO.—London.—The British authorities have been criticized of late for their failure to promote radio communication on a world scale, and with permitting France, Germany and the United States to occupy this field to the exclusion of England.

It is pointed out that France is planning a great station at Pondicherry, India, and that in July she will open a high power station at Buenos Aires. Later in the year two other stations will be ready in South America. These will be in direct communication with the French station at Saint Assise, with Nauen in Germany, and with Long Island, N. Y.

From Saint Assise, France, by radio, will reach India, China and Japan on the east and North and South America on the west.—*Associated Press Dispatch,* 16 June, 1923.

MISCELLANEOUS

U. S. NAVY EXPANSION NOT FEARED BY BRITISH.—London, May 17.—It is evident to observers on this side of the Atlantic that a strenuous campaign in behalf of naval preparedness is to be waged in the United States during the current year. American strategists for the past eighteen months have been growing more and more dissatisfied with the naval outlook.

It is the business of such people to look beyond the immediate present, to consider how a certain act of policy may affect the military situation not merely this year or next, but several years hence; and the result of their investigation seems to have convinced a majority of them that while the Limitation Treaty, on the one hand, practically eliminated the risk of war in the Pacific for the time being, its ultimate reaction will be adverse to the maintenance of peace unless certain precautionary measures are adopted in time.

Previous to the Washington Conference the risk of war was intensified by the obvious, if unavowed, battleship rivalry between the United States and Japan. That particular cause of danger having been removed, a casual glance might fail to discover any possibility of further friction arising out of a naval issue. But history teaches that national weakness has caused at least as many wars as national strength, and it is for this reason that American strategists view with misgivings the situation which has developed since the conference.

All might have been well had the American nation as a whole interpreted the Limitation Treaty aright and insisted on carrying out the naval policy embodied therein. But this is just what it has not done. The actual significance of that covenant appears to have been obscured by a smoke-screen of pacifist and economist propaganda. As one who regularly reads as many American newspapers as can be obtained, I have been struck by the frequency with which they refer to "naval disarmament" as something which has been already accomplished. The popular notion seems to be that with battleship tonnage rationed on a graduated scale, the entire naval problem has been settled for at least a decade and may safely be ignored.

If anyone begins to discuss relative strength in terms of cruisers and submarines or base facilities, trying to show that in these important factors the United States is gravely deficient, and would therefore have to fight under an almost fatal handicap if it went to war he is apt to be regarded either as an alarmist or a professional purveyor of what the doughboy called "tecknickel stuff." It is not the fault of the plain citizen, nor yet of the paper from which he takes his news and views, for both have been taught to measure naval power by battleships alone.

According to this simple formula, if the United States Navy has more battleships than the Japanese, it is *ipsa facto* the stronger of the two, and would therefore have no difficulty in beating the latter if it came to war. Evidently it is to combat this totally misleading conception, and at the same time to pave the way for a new shipbuilding program which is to go before Congress in December, that the new preparedness campaign has been organized.

Because an agitation of this nature is bound to involve references to foreign powers and comparisons between their fighting strength and that of the United States, it is sure to afford plenty of material for mischief-making by ill-disposed persons. It seems desirable, therefore, to emphasize the fact that there is not the slightest tendency in responsible circles here to see anything provocative or unfriendly in a movement having as its goal the reinforcement of United States naval power. Those who represent Britain as hostile to that aim are doing violence to the truth.

It is unfortunately a fact that this impression of British antagonism still persists to a marked degree in American naval circles. There is, for example, the oft-repeated charge that British delegates at the conference tried to out-maneuver their American colleagues on a number of crucial points; that they sided with Japan on the status quo proposal for insular fortifications, and generally showed themselves more anxious to secure the continued predominance of the British Navy in all respects than to arrive at an agreement based on Anglo-American parity. This charge has often been made by American writers, but so far as I am aware it has never yet been supported by an atom of proof.

If there is any foundation for it, the facts ought to be made public without delay. The British nation has been assured that its envoys to the conference did their best to promote real disarmament, and never failed to give the fullest support to American efforts in that direction. If this is untrue, the people over here would like to know it. So if any American writer has in his possession concrete evidence—not mere gossip or second-hand testimony—which proves the British delegates, either collectively or individually, to have worked against American interests at the conference, he would do a service by publishing them forthwith.

As things are I do not hesitate to affirm that an overwhelming majority of Britons who have pondered the matter at all realize the vitally important part which American sea power is destined to play in the maintenance of world peace. They perceive clearly that in circumstances which are liable to develop in the Far East at any time, the issue of peace or war might be determined entirely by the strength of the American fleet.

How could any sane Briton wish to see Japan in a position to impose her will throughout East Asia and over a large tract of the Pacific Ocean, where British interests are so widespread and weighty? It would be stark lunacy for Great Britain to support Japan against the United States on any serious political issue, and most of all on a question of relative naval power. Yet, oddly enough, there are American critics who first expatiate on the calculating shrewdness of British statesmanship, and then in the next sentence, accuse it of having pursued before, during and after the Washington Conference a policy for which imbecile would be too mild an adjective.

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To my mind, it is amazing that American naval officers, cognizant as they are of the almost insuperable difficulties that would confront them if they had to fight an Asiatic foe under existing conditions, should exhibit so much calmness and restraint when urging the need for greater preparedness. Were any civilian to find himself in a position of such terrible responsibility he would probably be overcome with panic.

A British admiral with whom I was discussing, some two years ago, the strategic situation in the Pacific, made the following pungent comment: "If America ever has to fight Japan before she has got proper fleet bases across the Pacific, the individual least to be envied in the whole world would be the American commander-in-chief. He would have no means of forcing a decision, since the initiative would rest entirely with the enemy, yet he would command a fleet sufficiently powerful to justify a public clamor for something to be done with it. And if he yielded to this clamor and engaged in any active operation, the odds against it succeeding would be 99 to 1. Villeneuve on the eve of Trafalgar had an easy problem compared with this. If I were an American naval officer, nothing less than the insistent call of duty would persuade me to command the fleet in a war with Japan, not only on account of the appalling responsibility, but because it would be practically impossible to make any active move which was not foredoomed to failure."

This may seem strong language, but it was not unduly so in view of the circumstances then envisaged, and which have since become even more unfavorable from the American point of view.—Hector C. Bywater, in *Baltimore Sun*, 2 June, 1923.

Comparative Naval Data for the United States, the British Empire and Japan

PERSONNEL (Unlimited)

	Actual personnel			Necessary for the 5-5-3 ratio			Increment necessary to attain the 5-5-3 ratio		
	Officers	Men	Totals	Officers	Men	Totals	Officers	Men	Totals
United States	7,707	86,512	94,219	12,842	109,115	121,957	5,135	22,603	27,738
British Empire	9,442	102,934	112,356	12,842	109,115	121,957	3,420	6,181	9,601
Japan	7,705	65,469	73,174	7,705	65,469	73,174	None	None	None

CAPITAL SHIPS (Limited)

	To be scrapped				To be retained	
	Old ships		New ships			
	Number	Tons	Number	Tons	Number	Tons
United States	17	267,740	13	552,800	18	525,850
British Empire	24	500,000	None	None	20	558,950
Japan	10	163,312	4*	161,158	10	301,320
Totals	51	931,052	17	713,958	48	1,386,120

* Recent reports are to the effect that 2 of these Japanese ships are to be finished up as aircraft carriers, leaving only 2 to be actually scrapped. On the basis of a total cost of construction at the rate of $1,000 per ton, the total saving to Japan from discontinuing the construction of capital ships would be less than $80,000,000.

HIGH SPEED LIGHT CRUISERS LESS THAN TEN YEARS OLD (Unlimited)

	Built		Building		Totals		Tonnage necessary for the 5-5-3 ratio	Increment necessary to attain the 5-5-3 ratio	
	Num.	Tons	Num.	Tons	Num.	Tons		Num.	Tons
United States	None	None	10	75,000	10	75,000	262,883	19	187,883
British Empire	44	218,390	4	34,600	48	252,990	262,883	1	9,893
Japan	10	51,210	15	106,520*	25	157,730	157,730	None	None

* 4 of 7,500 tons each and 4 of 10,000 tons each ordered since the Washington Conference, the only cruisers so ordered.

(Long Radius) SUBMARINES OF OVER 1000 TONS EACH (Unlimited)
(Numbers but no tonnages)

	Built	Building	Totals	Necessary for 5-5-3 ratio	Increment necessary to attain the 5-5-3 ratio
United States	3	3	6	46	40
British Empire	15	2	17	46	29
Japan	None	28*	28	28	None

* Indications are that about 25 of these submarines are post-Conference vessels, averaging over 1,500 tons each. At $1,500 per ton, they will cost about $56,000,000. As above, Japan is building 70,000 tons of post-Conference cruisers which, at $1,000 per ton, will cost about $70,000,000. That is to say that her new cruisers and submarine program, undertaken since the Conference, alone totals about $136,000,000 while, as above, her saving from not building capital ships would be less than $80,000,000. So the net increase in Japan's post-Conference building program will be over $46,000,000. Japan's initiative suggests that it would be wise for us to maintain the Treaty ratio.

ADMIRAL SIMS ON SUBMARINES.—The question of Rear Admiral Sims' attitude toward the German use of submarines during the war, about which there has of late been some misunderstanding, is set at rest by an article from the Admiral's pen in *Current History* for June. The thesis of this article is that "the submarine is sadly misunderstood by the American people," and that those excesses which can legitimately be charged against the use of this naval arm by the Germans are an insufficient justification for the steps taken to limit its use by the Washington naval treaty.

In spite of occasional illegal use and occasional brutality on the part of individual German commanders, Admiral Sims finds that "with almost no exceptions" the larger cruising submarines of Germany carried out their operations during the war "without any violation whatever of international law or the laws of humanity." He asserts that such outstanding and horrible cases as the sinking of the *Lusitania* and the hospital ship *Llandovery Castle* were rare exeptions. To back up the argument it is cited that the Allies themselves reported only fifty-seven cases of alleged atrocities against eighteen German submarine commanders, although as a total some thousands of merchant vessels were torpedoed by some hundreds of commanders.

"It is war-stimulated hatred," says Admiral Sims, "that has created the belief that the common practice of the German submarine commanders was not only simply to murder the crews of the merchant ships torpedoed, but to do so with all the savage cruelty they could conceive of . . . . I have met many people who, though normally thoughtful and kindly Christians, honestly believed these awful yarns."

The upshot of Admiral Sims' argument is that due to misapprehension as to the use of submarines during the late war the United States and other countries have made a mistake in trying to limit the use of an "exceedingly valuable" and "perfectly legitimate" naval weapon.—*Baltimore Sun*, 14 June, 1923.

BYWATER ON SUBMARINES.—In view of the disparaging statements made by certain British delegates at the Washington Conference with regard to the military value of the submarine and the oft-repeated Admiralty view that the surface ship will retain its primacy, at any rate for as long a period as can be legislated for, some surprise may be caused by the announcement that in the *X.1*, now on the stocks at Chatham, the British Navy will have the largest submarine vessel which any Power has built up to the present. So large are the dimensions of the *X.1* that she dwarfs even the German *U*-cruisers which were coming into service during the

last year of the war. Her displacement, in surface and submerged trim, is compared below with that of the heaviest submersible built previously.

	Tons
X.1	2,780/3,600
U.142 (German)	2,160/3,000
K.26	2,140/2,770
M.3	1,600/1,950
J-Class	1,200/1,820
L-Class	960/1,150

The *X.1* type may have been designed (a) for work with the battle fleet, a function that would demand very high speed; or (b) as a long-distance scout, convoy guard, or commerce destroyer, in which case high speed could be sub-ordinated to cruising endurance and armament. But until further details are forthcoming her true function must remain a matter of speculation. The only definite conclusion we may safely draw is that she has been built for ocean cruising, because with her huge dimensions she would be practically useless in the Narrow Seas.

It is in the last degree improbable that *X.1* represents an attempt to combine line-of-battle power with submersibility—in other words, that she is a miniature submarine battleship, for this is a type which naval opinion, for very good reasons, refuses to take seriously. Except in very rare instances a ship of war is never designed, let alone built, until her functions have been clearly thought out and her ability to fulfil them demonstrated by the most careful calculation. It is because a submarine battleship would be of no practical utility in the present state of naval tactics that constructors have not yet seen fit to waste their time in designing such a vessel. The only known attempt in this direction was made, some two years ago, by Professor Oswald Flamm, an eminent German constructor, and, so far as can be gathered, he was content to prove, on paper, that the building of submarines up to 10,000 tons, with an armament of several 8-inch or 9-inch guns mounted in turrets, was technically feasible. There is no record of his having suggested that units of this type would be sufficiently valuable to justify their construction.

To the lay mind, prone to be fascinated by the unusual, there is something attractive in the conception of a huge submarine, armed and armored like a battleship, yet capable of diving below the surface and behaving in every way like an ordinary *U*-boat. It seems worth while, therefore, to quote the opinion of a practical seaman who, having commanded both small and large submarines during the late war, is in the best position to judge of their respective merits. Writing in the *Marine Rundschau* some months ago, Commander J. Fechter, of the German Navy, gave a number of cogent reasons in favor of keeping to moderate dimensions in the design of submarines. This officer, it appears, originally commanded *U*-boats of medium size, say 800 tons, but toward the end of the war was appointed to a "*U*-cruiser," in which he made one voyage. He begins by admitting the possibility of building a 10,000-ton submersible, which would have armor and heavy guns in proportion, besides being perfectly stable and safe at sea, whether cruising on or below the surface. The only difference between this and a smaller submarine would be one of dimensions and in the power of the mechanism which determines the position of the vessel when submerged, such as hydroplanes, regulating and trimming tanks, with their machinery, pumps and compressed-air plant. "But," he adds, "it would be impossible with such a vessel to wage *U*-boat warfare as we did in the late campaign."

In Commander Fechter's opinion the main objection to very large submarines is the difficulty of handling them, an argument which he elaborates

at some length. "It is no accident," he writes, "that the brain of the *U*-boat—the conning tower and the control room—was placed in the center of the boat. In the control room was concentrated all the diving machinery, and everything was done from this position. A submarine is an apparatus with which the operator must be perfectly familiar down to the minutest detail, and was for this reason that all the controlling gear was brought together in a small space. Our success with small and medium boats was mainly due to this system. From the control room of such a boat the captain could see everything that happened. If anything went wrong he did not have to wait for a report, but, observing the trouble himself, instantly took steps to put it right. As the bulkhead doors were open, his view from the control room extended fore and aft; he could see equally well what was going on in the bow or in the stern compartments. If water was entering the boat at any point he observed it at once, and could direct attention to it by word of mouth or signs. The boat, in short, was absolutely under his control, just as the crew were always under the eye of their superior officer. There could be no idling, loitering, or neglect of duty, because he saw and heard everything. Such were the conditions on board the small and medium boats.

"Then came the *U*-cruisers. The name itself influenced the design. It was no longer a boat that had to be constructed, but a cruiser, with all the features pertaining to that type. The technical problems of construction and equipment were brilliantly solved. But to manipulate all the new devices crowded into the vessel a larger personnel was required, which ought to have consisted of the most highly-trained men; but the living quarters were not large enough to accommodate a crew of the requisite size. Although everything possible was done to bring all the control instruments under the captain's hand, he no longer had a clear view of the interior of the vessel. The control room was divided; the upper part contained only the hydroplane gear, the compressed apparatus; in the lower part was housed the mechanism for diving, such as bilge pumps and flooding valves. So the captain never knew, for instance, whether the main bilge pumps were drawing or not. He could only go by the rise or fall of the depth manometer, but by then it was almost always too late; the boat was generally either too high or too low, and had to be brought back to the proper depth by violent measures, for the huge mass did not respond to delicate handling.

"It was just the same with regard to trim. The trimming pumps were placed in the bow or stern compartments and operated from the control room. So here, again, the question would arise: Are they drawing or not? Must we use the air blast? If this were done and the boat was properly trimmed in time, the man in the bow compartment would forget to expel the air from the trimming tank, which he ought to do after every turn of the pumps, and next time something would be sure to go wrong, just as the captain was on the point of firing. At the critical moment the boat would dive, the attack fail, and the opportunity for attacking be lost. Light signals, telephones, voice-pipes, etc., were fitted, but all to no purpose. The essential power of personal observation had been sacrificed to increase dimensions. Instead of relying entirely on himself, as hitherto, the captain had now to rely on others."

Coming to his personal experience in a *U*-cruiser, Commander Fechter says that his crew consisted in part of men who had served with him in other boats, in part of untrained ratings from the battle fleet, and in part of recruits who had gone through the submarine school. "We had no opportunity of taking the vessel into action. I made one cruise in her, which did not go off particularly well. Team work was hampered by her size. In submarine navigation the personal relations between all on board are a more important factor than in any other type of craft.

Mutual trust is the basic element of success. It is a comparatively simple matter to build submarines of any dimensions; but to navigate large submarines is only possible with a picked crew of highly-trained men, who must be absolutely under the control of two officers, the captain and the chief engineer, who in turn must support each other. The larger the boat the more difficult she is to navigate."

The writer then discusses the tactical rôle of submersible battleships. These may carry guns of heavier caliber, but in number of guns they will always be outclassed by the surface vessel. If they engaged ordinary battleships they would soon be forced to break off action, because every hit would deprive them of the power to submerge; consequently they must dive before being hit. It would then be necessary to keep under, perhaps all day, to avoid enemy counter-attack. "To make a torpedo attack unobserved at periscope depth in a 10,000-ton submarine if the sea is rough, or even if a slight swell is on, I hold to be impossible. All that the submarine battleships could do, therefore, would be to keep under and proceed on diverging courses, to avoid ramming one another, and unite later at some rendezvous agreed upon beforehand. A practical method of communication which would make possible submerged cruising in formation has not yet been found. . . . The submarine battleship can only use its power of submersion for defensive purposes, to withdraw, as it were, into a bomb-proof shelter. It would not be able to carry out those surprise attacks which make the small or medium *U*-boat so formidable. Its presumably high speed would be of great value for commerce-destroying purposes, but on the other hand high speed would be purchased at the expense of cruising endurance. In surface actions it would always be inferior in artillery power even to old battleships, and hits would be far more dangerous to it than to them. We may say, therefore, that while the submarine battleship could be built, it would serve no good purpose." —*Naval and Military Record*, 23 May, 1923.

Number of Ocean-going Submarines.—The number of ocean-going submarines of 1,500 tons or more, with a surface speed of 20 knots or more, and a cruising radius exceeding five thousand miles, completed, under construction, or projected by the United States, France, Japan, and this country, are:

United States:

Under construction, three;
Gun armament, one 5-in.;
Projected, six (but no money voted);
Armament, one 5-in.
France—*Nil.*
Japan—No official information.
Great Britain—*Nil.*

The numbers of submarine warships in full commission are:

United States, 76;
France, 41;
Japan, 43;
Italy, 43;
Great Britain, 52, of which 12 are in reserve.

The additional numbers capable of being put into commission are:

United States, 26;
Great Britain, 7; and the remainder, *nil.*

—(Navy Financial Secretary.)—*Army, Navy and Air Force Gazette*, 12 May, 1923.

BATTLESHIP HOLDS LEAD AGAINST PLANE.—Washington, May 26.—Official cognizance has been taken by the Navy Department of the controversy that is fast heading up over the airplane and its relative importance, present and future, in the continuance and development of America's sea power.

In and out of the service a school of thought is developing that the airplane is the all-essential weapon and has rendered the battleship obsolete. While there are few such "extremists" in the active service, there are exponents on the outside whose views are widely heralded, and for obvious reasons their doctrine appeals to the popular mind. Actual accomplishments fire the public imagination and the economy arguments appeal strongly to the taxpayers.

Realizing this, the Navy Department has taken definite action to determine the real merits of the controversy and to adapt the naval policy to changed conditions of naval warfare.

The General Board has just completed an exhaustive investigation of all of the elements of present day sea power as affected by the development of the airplane, submarine and other modern weapons of warfare at sea.

For weeks past the board has been studying the intricate problems involved in all their different phases. Officers and experts representing every branch of the service have been called into conference and an effort made to get the varying shades of opinion in the service from the few "bitter-enders" who cling unchanged to the old school of thought, to the few extremists who hold the airplane as the all-powerful weapon.

While no official report has been made public, individual members and responsible heads of the Navy hold that in spite of the great strides made by aviation nothing has happened to warrant the conclusion that it is rendering the surface craft obsolete or that the battleship has or will be superseded as the "backbone" of sea power.

WANT MORE CRUISERS

As a direct result of this study, the board's report will embody recommendations that Congress provide for new 10,000-ton cruisers, the maximum figure now being twenty, mine-laying and scout submarines, twelve of each type being needed, half of which should be provided for at the next session, and six gunboats.

On the other hand full recognition is given the growing importance of aviation as one of the vital branches of naval power and the need for furthering it as much as possible, as an adjunct to the fleet afloat. Sharp issue, however, is taken with those who contend that the aerial fighting forces are supreme.

"Misleading propaganda" of certain ultra-enthusiastic exponents of aviation that tends to create a popular belief that it has made the battleship an obsolete weapon is also scored by all heads of the department.

Secretary Denby reiterates his fixed belief that the battleship is still the backbone of the fleet. Assistant Secretary Roosevelt declares that "any course of action which would eliminate the battleship would be a national disaster," while Admiral Robert E. Coontz, Chief of Operations; Rear Admiral W. L. Rodgers, head of the General Board; Rear Admiral William A. Moffett, Chief of the Bureau of Aeronautics, and practically all ranking officers in the department are outspoken in their opposition to the "exaggerated claims" that have of late been so widely disseminated.

FOR NAVAL TREATY RATIO

Summed up, the opinion of naval leaders is that the development of aviation as a vital branch of the service cannot be pushed too strongly, but

at the same time the surface fleet must be rounded out to the 5-5-3 ratio provided for by the Naval Treaty.

This is in line with the attitude taken by the other great naval powers, both England and Japan being now engaged in strengthening their surface fighting forces strictly within the limits of the treaty.

Secretary Denby said:

"The line-of-battle ship, whether the seventy-four of early days or the 33,000-ton, 16-inch gun battleship of today, has always been and still is the main reliance of fighting fleets. Enthusiasts for each new weapon of sea warfare predict that the heavy-armored, heavy-gunned ship is doomed by that particular weapon. It was so with the submarine, but nobody now claims that the submarine made the battleship obsolete. It is so now with the airplane—but the battleship still is the strongest element in the nation's sea defense, and will be as long as most of us now living are concerned with mundane affairs.

"We must keep our sense of proportion. If the battleship is obsolete because of the weapon of the air, so, of course, most certainly are other ships less powerful than the battleship also obsolete. Accepting that premise, floating navies are about to become extinct.

"The premise and the conclusion cannot be accepted. The tremendous importance of the new weapon, the airplane, is clear. Every effort is being made to develop it and to make it as effective as possible for offense and defense. The place of the airplane in armies and navies is assured and vital, but the ships that float upon the sea are still the nation's strongest seapower."

Opinion of the Navy

Voicing the consensus of the service on the airplane-surface craft controversy, Assistant Secretary Roosevelt, after a careful digest of the facts brought out at the board's hearings, says:

"One group tends to discount the airplane's value. This, of course, is wrong. The airplane is a great and necessary development and will have far reaching effects in military science. It must be developed, carefully developed, and the department is bending every effort to this end.

"The other group contains those who hold that the airplane is the all-important naval weapon and that it has rendered the battleship obsolete. This doctrine is the more dangerous, for at this time it makes a really popular appeal. It strikes the imagination, for the air service is romantic, and it can be argued on the basis of economy.

"Any course of action that would eliminate the battleship would be a "mistake."

"The battleship in the navy corresponds to the infantry in the army. There is an old saying, variously attributed to Napoleon and other great leaders, which says in effect, 'The infantry is the army. When the infantry is defeated, the army is defeated. When the infantry is victorious, the army is victorious.' All other branches are but auxiliary 'arms.' Substitute 'battleship' for 'infantry' and 'fleet' for 'army' and the same holds true.

"We must ceaselessly reach for the new ideas and improvements along every line. But if we do not, our navy will fossilize. We must bend every effort to development of the air service. But we must not be carried away by dreams; we must not mistake fancy for fact. The battleship remains at present the backbone of forces afloat. The fleet will be helpless without its auxiliary arms, but it is the guns of the great ships that will hammer out victory when the fate of the nation hangs in the balance."

Admiral Coontz said:

"The air force is a component part of the United States Navy. From time to time new weapons come into play and gradually assume their

places for offense or defense. The battleship itself is constantly undergoing evolution, and is changed to meet changing conditions. The water surface is still the great floor of commerce, and although above the surface and below the surface weapons cause changes to be made, the battleship is, and will be for many years to come, the backbone of the fleet."

Rear Admiral Rodgers said:

"Aircraft derive their importance from the fact that they rise in the air and are the fastest means of travel known to mankind. They are not weapons, but vehicles only.

"Their importance upon which the public has fastened its attention arises from their impunity from pursuit by any other vehicle. This importance is greatly reduced when they are opposed by equally speedy enemies.

"When both sides have aircraft the rôle of the aircraft on both sides sinks to an auxiliary only. Aircraft can be supreme only when possessed by one side only."

Rear Admiral Moffett said:

The airplane in the American Navy is being developed as an adjunct to the fleet and not as a substitute for the capital ship. Nobody in the service who is familiar with the development of aviation believes the advances made, phenomenal as they are, have rendered obsolete the surface fighting craft. We of the aviation branch are bending all of our energies toward making naval aviation as much a part of the fleet as the submarines have become."

The Technical Side

The technical side of the controversy was probed deeply during the board's study and the situation as it exists today is concretely sized up in a "consensus" statement which expresses the opinion of naval aviation experts as well as ranking line officers.

It is a favorite statement of those who see in military aeronautics a means of cheap effective warfare that a $15,000 airplane can sink a battleship. This statement usually carries with it the implications that battleships and other ships of the navy should be replaced by aircraft, and that this would be an economical procedure.

The original cost of an airplane is small, but, it is pointed out, aircraft wears out and becomes obsolete in two years time. Add to this the unavoidable expense of maintenance in the very high percentage of loss, through crashes and other operating causes.

Eighteen of the most modern battleships and battle cruisers, 200 modern destroyers, thirty modern cruisers, fifty modern submarines could be built for two-thirds the cost of our aviation effort during 1917, 1918, 1919 and 1920. These vessels would be effective for twenty years.

Aside from the economy argument, let us look at the tactical problem presented to a bombing plane about to attack a battleship at sea. First of all the attacking plane will be under fire long before he can drop his bomb. He will drop his bomb from a position about a mile above sea level, at a time when he is well within range of a dozen or more machine guns firing 250 rounds per minute. Added to this disturbing shower of bullets will be the barrage of bursting shrapnel of large caliber anti-aircraft guns. The aviator must

Judge accurately the course and speed of the battleship.

Judge accurately the direction and force of the wind, then shape his own course through the air so that the combined effect of the speed and the course of the plane and the direction and force of the wind will cause

the plane to travel along a straight line that will, when prolonged, pass through the battleship at the instant the bomb completes its fall.

Having done all this, the aviator, without swerving his plane and while maintaining it horizontal, must release his bomb at the right time within a fraction of a second.

If he does all this faultlessly, unruffled by bursting shrapnel and the whistling streak of tracer bullets, and if there are no cross currents of wind lower down, and if the ship does not change her course, it is probable that one bomb in twenty-five will hit. Probably five hits by large bombs would disorganize, but not sink a modern battleship. So much of the tactical problem.

The Strategic Problem

The strategic problem involved in air-craft versus surface ships is fundamental, and, under present or foreseen conditions, admits of but one solution. The great systems of world commerce operate on the surface of the sea. Armies move on the surface of the earth and the surface of the sea. Every industrial, political, military, naval and air activity derives its support from the land. Ability to hold and to control the land and to control what happens on the surface of the sea are essentials of success in war.

Another and very important point that has the support of all history is that success in war belongs to the side that takes the offensive. Consider now the fact that 3,000 to 6,000 miles of sea lie between the United States and a possible enemy. Let us say that war is declared with some power across the sea and that we proposed to fight the war out in the air, unaided by ships. Every outlying possession of the United States—Alaska, the Philippines, Guam, the Canal Zone, Porto Rico—will fall into enemy hands because his ships may carry all the force he wants to those points and because the forces we maintain there can never be strong enough to resist indefinitely without reinforcement. The enemy fighting ships will see to it that our merchant ships and our transports shall not cross the sea with reinforcements. Aircraft cannot prevent them from doing this. What can we do to the enemy with aircraft and without ships? Nothing, unless we are within flight distance of him.

It is conceivable that we may defend our home coasts successfully, but even here aircraft are useful in defense only during the daylight. Weapons that are primary, that control and decide, must be on the job twenty-four hours a day and must be capable of searching out and attacking the enemy where he lives. They must be capable too of holding what they gain. Aircraft may attack within the radius of their flight, but they can hold nothing, they cannot advance their shore positions or even hold them without the aid of troops and fortifications and all the paraphernalia of war existed prior to their advent. They have added to hazards and complications and possibilities of war, but have displaced nothing. They are auxiliary weapons.

Armies that move upon the ground and ships that move upon the seas are still the controlling factors in war. Aircraft support other military effort and do it with spectacular efficiency, but those who think that because of aircraft we can do without navies and armies lack that fundamental of military genius—strategical and tactical vision.

The field of aircraft over the sea is already wide and will expand. They will scout, attack ships and stations with bombs and torpedoes, and will increase greatly the gunnery efficiency of a fleet in the earlier stages of battle. But when America is considering the offensive warfare in defense of her rights and her policies, there is no other way to attack the enemy than through the medium of ships first.

Without ships we fight our enemies on our own soil. With ships we may carry the war into enemy territory. Aircraft cannot perform this function for the nation till ships have carried their supports across the sea and guarded them there. Fleets—battleships and their attendant vessels—are the only means for carrying American national power into distant areas in war.—M. H. McIntyre in *The New York Times*, 27 May, 1923.

South American, Russian, and Italian Armaments.—According to latest advices, the Pan-American Conference at Santiago de Chile has failed to reach an agreement on the subject of naval armament limitation. A telegram to *La Nacion*, of Buenos Ayres, explains the proposal, submitted by Chile, for regulating the acquisition of capital ships by Latin-American States. This provides for a treaty covering five years, during which period none of the States in question would be free to acquire capital ships which would increase their total tonnage beyond a limit to be determined by discussion, but tentatively suggested as 60,000 or 80,000 tons. The treaty would expire on May 1, 1928, but it could be automatically renewed for a further five years by mutual consent, failing which a special conference must be summoned to draw up a new convention. The Washington Treaty definition of a capital ship has been accepted by the delegation: viz., any ship in excess of 10,000 tons and mounting guns larger than 8-inch caliber.

Brazil objects to the limit, suggested by Chile, of 60,000 tons as the maximum of capital ship displacement to be owned by any South American State, on the ground that it would inhibit the Brazilian Navy from acquiring any modern battleship. Argentina, on the other hand, opposes the Chilean alternative limit of 80,000 tons, because this would enable her Brazilian neighbor to purchase a battleship of the greatest tonnage and power. As these differences of opinion persist in spite of all discussion, an agreement as to battleship tonnage is now regarded as unattainable. On the initiative of Chile negotations were proceeding last week for the limitation of land armament, and all the Latin-American Powers have been invited to submit reports on their respective Armies and other military assets.

But for the inordinate cost of modern warships it is probable that a naval competition would have already started among the three leading States of South America, and particularly between Brazil and Argentina. Brazil was the first Latin-American Power to acquire ships of the all-big-gun type, and for some years her possession of the *Minas Geraes* and *Sao Paulo*, delivered in 1910, gave her an unquestioned superiority over her neighbor. Judged by modern standards, however, these ships are now obsolete. Notwithstanding the extensive refit they underwent at New York recently, they are surpassed in fighting value by the Argentine ships *Rivadavia* and *Morena*, which were laid down three years later and are heavier by nearly 8,000 tons, besides having a higher speed and stronger armament. In addition to her old Dreadnaughts, Brazil has only the light cruisers *Bahia* and *Rio Grande do Sul*, which there is some talk of converting into oil-fuel burners and rearming with more powerful guns; ten old destroyers, whose machinery is reported as defective from long use and lack of adequate repair; and three small submarines, built in Italy ten years ago.

Except for its two battleships the Argentine Navy is also deficient in modern material, though its array of old cruisers makes a respectable showing on paper. The best of its smaller craft are four 950-ton destroyers of good speed and armament, which were built in Germany a few years before the war. There are no submarines in the fleet. A program was prepared in 1918, comprising four scout cruisers, eight large destroyers, twenty submarines, and several auxiliaries, but this was held up for

financial reasons, and nothing has come of it to date. The personnel of the Argentine Navy numbers about 9,500 ranks and ratings, and is therefore about fifty per cent stronger than that of Brazil.

Whatever the outcome of the Pan-American Conference may be, it is considered unlikely that any of the States concerned will purchase or order a new capital ship within the immediate future. To have a battleship built abroad would cost at least £5,000,000, while the acquisition of surplus Dreadnaughts from any foreign Government is forbidden by the Washington Treaty. If naval competition develops, therefore, it will be in the direction of smaller vessels and aircraft. Señor Franco, representing Brazil at the Pan-American Conference, denies that his Government is negotiating with the United States for the purchase of submarines worth ten million dollars, but it is known that American firms have sent in quotations for the construction of such boats. News from a reliable source indicates that the Argentine Government has also been making inquiries for submarines both in the United States and Europe.

At the present time Chile is undoubtedly the principal naval Power in South America. In the *Almirante Latorre* she possesses the only up-to-date capital ship to be found in that area, for this vessel, in addition to its powerful battery of ten 14-inch guns, has much of the special fighting equipment which was added to British capital ships as the result of war experience. The Chilean fleet of *Elswick* cruisers, though obsolete in point of age, would be a potent factor in hostilities against a neighboring State, as at least four of the ships are still able to steam at 21 knots. Other useful craft are the five big flotilla leaders of the *Admiral* class, reclaimed from Great Britain in 1920, and six *Holland*-type submarines built in the United States for the British Government early in the war, but not delivered, and eventually ceded to Chile. The personnel of the Chilean Navy has been enlarged in recent years, and now numbers about 9,000.

Information concerning Russian naval activity is as plentiful as it is unreliable, but the following items are sent by a correspondent who vouches for them as dependable: "After endless discussion, chiefly about ways and means, the Moscow Council of Defense approved, late in March, the first naval shipbuilding program to be drafted under the Soviet régime. It owes its inception to the zeal of Trotsky, who alone among the Bolshevist leaders attaches any importance to sea power. His aim is to create a Navy which shall be at least strong enough to ensure Russian predominance over all the Baltic countries except Germany, and at the same time exercise undisputed control in the Black Sea. This program he regards merely as a first installment, to be followed by a more ambitious scheme should the shipbuilding and kindred industries prove capable of undertaking the work. The largest of the ships now authorized is a scout cruiser of the *Svietlana* class, four of which have been lying unfinished in the Neva ever since the war. A board of experts is to survey these vessels and decide which of them may be completed in the shortest time and at the smallest expenditure. The selected cruiser will then be taken in hand and prepared for sea as quickly as possible. At full load the displacement will be 7,000 tons; the designed speed is 30 knots, and the original armament of 5.1-inch quick-firers may be superseded by heavier guns. The first duty of this ship will be to show the Soviet flag abroad, and she will accordingly be dispatched on a long cruise in foreign waters. The program further authorizes the building of six *Baltic* submarines, of approximately 800 tons, the plans of which are ready. Their Diesel machinery will be built under the M.A.M. license at the Putiloff works. For the Black Sea a flotilla of four destroyers and ten submarines is to be constructed, presumably at Nikolaieff. This yard, after remaining closed during the greater part of the winter, has lately been

reopened. Reports from Odessa state that the cruiser *Nakhimoff* is now almost ready for service, and will be commissioned this summer. She has been nearly ten years under construction. Her characteristics are identical with those of the *Svietlana* class: viz., 7,000 tons, 30 knots, and a numerous battery of light guns, which may have been replaced by 6-inch. The rumor that *Nakhimoff* had been renamed *Kemal Pasha* was apparently untrue, as she is now referred to in Odessa messages as the *Tscherwonia Ukraina.*"

The Italian shipbuilding program about to be put in hand is chiefly remarkable for the size of the various units it embraces. The two new cruisers are to have the maximum displacement permitted by the Washington Treaty: viz., 10,000 tons, and a speed of not less than 34 knots. The four destroyers will be vessels of 2,000 tons or more, and 36 knots speed, and the four submarines will displace 1,000 tons in surface trim. All the new vessels will carry 21-inch torpedoes, as the 18-inch mark hitherto used by the Italian Navy is no longer considered sufficiently powerful.—Hector C. Bywater in *The Naval and Military Record,* 2 May, 1923.

"The Case Against the Naval Treaty."—To summarize the results of the conference as against its purpose:

1. The treaties have failed to lessen the burdens of past wars.

2. They failed to cut the expenses of the existing armed forces of the world because (*a*) they did not limit land forces, one of the chief contributors to this expense; (*b*) they did not limit air forces; and (*c*) they did not cut the existing naval forces. The status quo was the basis of the Hughes proposals.

3. They failed to reduce the expenses of future wars because (*a*) they failed to limit land and (*b*) air forces; and (*c*) while they limited the construction of capital ships and aircraft carriers, they failed to stop naval competition in cruisers. The energies of foreign powers have been turned away from capital ships to cruisers and smaller craft.

To summarize the results of the conference regarding the equities involved:

1. The Four-Power Pact and various agreements exclusive of the Naval Treaty do not properly guard American foreign policies in the Far East. The agreements practically leave the whole of Asia under Japanese dominance.

2. The Naval Treaty does not give America parity with Great Britain. It does not give America parity with Japan in the Asiatic sphere of operations. It provides that Guam and the Philippines and other remote possessions of the United States are denied their proper defenses.

3. The Naval Treaty has denuded America of its power as the first naval nation. No comparative sacrifices were made by the foreign nations that might in any way equalize America's great sacrifices.

4. By turning naval competition from capital ships to cruisers, the conference tended to increase rather than decrease America's expenditures on naval armaments.

5. In signing treaties which deny proper defenses to her Pacific outposts, America has increased the chances of war by greatly increasing our impotence.

6. Through the abolition of American power in the Far East America's world influence and prestige have been materially decreased.

7. In limiting naval armaments only, the treaties have placed America at a great disadvantage, as sea forces are our prime means of defense.

8. In signing the treaties America can be considered to have tentatively bound her right to self-defense.

These are only major inequities forced upon America through the treaties. There are many details of lesser importance which are just as inequitable to us. Some of them are the listing of the British battleships *Revenge, Resolution* and others at 25,750 tons displacement, when it is a well-known fact that these ships actually displace 29,000 tons or more, and the listing of all the British and Japanese capital ships at their national measurements of displacements instead of at their normal displacements comparative to the normal displacements of the American battleships. This has the effect of making our tonnage totals appear large and the foreign totals small. There are many other details wherein the Naval Treaty is decidedly unfair to America, but which, for our present purpose, must be passed over so that they will not detract from the main issues.—Abstract from Mr. Graser Schorustheimer's article in *Current History* for June, 1923.

CURRENT NOTES AND PROFESSIONAL PAPERS

"The Benson Super-Pressure Plant."—(First of two articles on a plant designed for 3,200 pounds of steam pressure. Explains generation of steam without boiling with following claims for economy: (1) Saving in fuel; (2) Reduction in initial cost; (3) Saving in floor space; (4) Saving in weight.)—By P. W. Swain in *Power* for 22 May, 1923.

"The Passing of Sea Power."—("First, a battle fleet cannot carry on an attack across the ocean. Second, a great army cannot be sent overseas. Third, a base five thousand miles from home—surrounded by enemy bases—is no base at all. Fourth, submarines, air forces, mines and torpedoes suffice to defend a coast. Fifth, seacoast forts are useless. Sixth, it is only by transporting overseas an overwhelming air force to seize and control the air that one continent can attack another. Seventh, each continent will control its own destiny if it arms itself with modern weapons. Eight, inter-continental wars are discouraged.")—By Rear Admiral William F. Fullam, U. S. Navy (Retired) in *McClures* for May, 1923.

Pertinent Articles in:

Journal of the American Society of Naval Engineers, May, 1923.

(1) "U S. S. *Asheville*." Description and official trials. By Lieutenant Commander H. G. Donald, U. S. N., Member.

(2) "Electric Drive on Battleships." By Alexander Mark Charlton, Lieutenant Commander, U. S. N., Member.

(3) "Low Pressure Vacuum Evaporators." (Multiple-Effect Film Type). By Commander C. A. Jones, and Lieutenant Commander A. M. Charlton, U. S. N., Members.

(4) "Notes on Fouling of Ships' Bottoms and the Effect on Fuel Consumption." By Captain Henry Williams (CC), U. S. N., Member.

(5) "The *Langley* Chronograph." By Lieutenant Commander Gysbert B. Vroom, U. S. N., Member.

Journal of the Royal United Service Institution for May, 1923:

(1) "Gold Medal (Military) Prize Essay." By Major R. Chevenisc Trench, O.B.E., M.C., Royal Corps of Signals, subject: Discuss the manner in which scientific inventions and science in general way effect both strategically and tactically, the next Great European War in which the British Empire may be engaged. Indicate the organization and training required to secure the views which you may have formed as regards the Imperial Military Forces.

(2) "Policy and Strategy" (Lecture). By Field Marshall Sir W. R. Robertson.

The Coast Artillery Journal for May, 1923:

(1) "Military Reasons for Paying for Supplies in the Enemy's Country." By Colonel Samuel C. Vestal, C. A. C.
(2) "The Tactical Employment of Anti-aircraft Machine Guns." By first Lieutenant Halstead C. Fowler, C. A. C.
(3) "Recent Developments in Anti-aircraft Matériel." By Captain Aaron Bradshaw, Jr., C. A. C.
(4) "Notes on Anti-aircraft Machine Gun Fire." By Robert V. Morse, Consulting Engineer, Morse Instrument Company.

The Coast Artillery Journal for June, 1923:

(1) "The Dardanelles Expedition." By Lieutenant Colonel Walter H. Johnson, Infantry, (D. O. L.)
(2) "Heavy Tractor Artillery in its Relation to Coast Defense." By Major G. Ralph Meyer, C. A. C.
(3) "Observation Grill for Anti-aircraft Artillery." By Captain Aaron Bradshaw, Jr., C. A. C.
(4) "A Universal Panoramic Sight." By First Lieutenant F. W. Gerhard, Jr., C. A. C.

Mechanical Engineering for June, 1923:

(1) "U. S. Navy Crane Ship No. 1: An Achievement." Editorial.
(2) "Proposed Code for the Care of Power Boilers."

Current History for June, 1923:

(1) "The Truth About the German Submarine Atrocities," by Rear Admiral W. S. Sims.
(2) "The Chester Concession as an Aid to New Turkey," by Henry Woodhouse, with full text of the Chester Concession.
(3) "The Case against the Naval Treaty," by Graser Schornstheimer.

The Fortnightly Review for June, 1923:

(1) "France and the Treaty of Versailles," by A. L. Kennedy.
(2) "The Chester Concession," by Clair Price.
(3) "The End of the Mark Currency: A Letter from Berlin," by Robert Crazier Long.

The Nineteenth Century for June, 1923:

(1) "The Evil Russian Government," by Captain Francis McCullogh.
(2) "The Navy and its Weapons in War," by Rear Admiral Sir S. Eardley-Wilmot.
(3) "Will Disarmament Bring Peace?" by Howard Little.

The Edinburgh Review for April, 1923:

(1) "Sea Surgeons," by Philip Gosse.
(2) "America's Part in the Treaty of Versailles," by A. L. Kennedy.

The Quarterly Review for April, 1923:

(1) "Haig and Foch," by Major General Sir G. Aston.

Asia for July, 1923:

(1) "Shall We Trust Japan?" by F. D. Roosevelt.

NOTES ON INTERNATIONAL AFFAIRS

FROM MAY 23 TO JUNE 23

PREPARED BY

ALLAN WESTCOTT, PROFESSOR, U. S. NAVAL ACADEMY

RENEWED REPARATIONS CONFERENCES

GERMANY'S LATEST OFFER.—Another German reparations proposal was submitted by Germany on June 7. In brief Germany offered the revenues of her railway system, and a first mortgage on German real estate, together with customs and excise receipts, as security for payments amounting to about 1,500,000 gold marks each year. For further discussion of this system of payment by guaranteed annuities, the note proposed a renewal of direct conferences.

ALLIES CONSULT ON REPLY.—Before replying to the German offer of June 7, the French and Belgian Governments submitted their views to Great Britain, in an effort to secure once more a united Allied front on the reparations question. The French and Belgian Governments insisted that the German policy of passive resistance in the Ruhr must be abandoned as a preliminary to any conversations, and that evacuation of the Ruhr must be determined by actual payments on the part of Germany.

In subsequent Allied discussions in London no final decision was reached. Prime Minister Baldwin on June 15 indicated that the British Government did not intend to give unqualified approval to the occupation of the Ruhr, and that if France were unwilling to make further concessions as a means of reopening reparations discussions, the Prime Minister would announce a separate British policy.

GREAT BRITAIN

THE NEW BALDWIN CABINET.—Following his appointment as Prime Minister on May 23, Stanley Baldwin was unanimously elected head of the Conservative party at a meeting held in the Cecil Hotel on May 28. Lord Curzon remained in the Cabinet as Minister of Foreign Affairs, and L. S. Amery as First Lord of the Admiralty. Sir Robert Cecil entered the Cabinet as Lord Privy Seal with the understanding that he should represent the Government in the League of Nations Council. The Chancellorship of the Exchequer was filled by the appointment of Reginald McKenna, a former Liberal, whose acceptance greatly strengthened the new Ministry.

RUSSIA YIELDS TO BRITISH DEMANDS.—In a note to the British Government on May 23 Russia made satisfactory concessions in regard to most points in dispute between the two governments. She offered compensation for trawlers sunk, withdrew the objectionable letters written to British representatives, and suggested a special conference concerning Soviet propaganda in the Near East. In reply to a further British communication, it was announced on June 3 that Russia had consented to reduce the personnel of her legations in Afghanistan, Persia, and Khiva (Russian Turkestan) and to consult the British government in the selection of their successors.

NEAR EAST

GRECO-TURKISH AGREEMENT.—A threatened reopening of hostilities between Greece and Turkey over the question of payment of war damages was averted on May 26 by an eleventh-hour compromise. Greece agreed to cede to the Turks the town and district of Kariaghatch, opposite Adrianople on the Maritza River, provided Turkey gave up all claims for war indemnity. This decision, however, involved difficulties with Bulgaria, whose rail exit to the Aegean will now cross both Turkish and Greek territory.

BULGARIAN CABINET OVERTHROWN.—The Stamboulisky Cabinet in Sofia was overthrown on June 9 by opposition forces, and most of the ministers and leaders of the Bulgarian Peasant party were put under arrest. A new cabinet, chiefly bourgeois in complexion, was organized under Professor Zankof of the University of Sofia. The overthrow of the Peasant party government resulted from dissatisfaction in the army and the cities against the strictly agrarian policies of the former régime, and marked the return to power of formerly pro-German and strongly Nationalist elements in Bulgaria. The former Premier, Stamboulisky, was shot and killed on June 14 in attempted escape after his capture.

FAR EAST

RESIGNATION OF CHINESE CABINET.—On June 6 the Chinese Cabinet under Premier Chang Shao-tseng resigned. The Cabinet was assembled by President Li Yuan-hung on January 4 of this year. Its fall was brought about by conflicts between the Premier and the Chihli war lords over the methods of bringing about unification, and by difficulties over the release of foreigners held by the Shantung bandits. President Li Yuan-hung was subsequently forced to resign and fled from Peking to Tien-tsing. Later he withdrew his resignation, on the ground that it was obtained under duress.

BANDIT-CAPTIVES RELEASED.—On June 12 and 13 all the remaining foreigners in the hands of Chinese bandits were released, as a result of extended negotiations in which Mr. Roy Anderson, an American newspaper man, took a prominent part. At that date about 2,000 of the bandits

were taken into the Chinese army, in fulfilment of the terms of the surrender.

UNITED STATES

AUSTRIAN LOAN OVER-SUBSCRIBED.—Of the total $130,000,000 loan for Austria, $25,000,000 was put on the American market in the first week of June. As a result of the sale, the bonds were about four times over-subscribed, the subscriptions amounting to about $100,000,000.

ARMY COSTS AGREEMENT SIGNED.—On May 25 the American and Allied delegates at Paris signed the terms finally agreed upon for payment of the $245,000,000 due to the United States from Germany for the cost of the army of occupation.

In substance it provides that the net cost of the American Army occupation shall be paid out of the Allied receipts from Germany in twelve annual instalments. During the first four years America will be paid her instalments up to twenty-five per cent of the cash receipts from Germany if any is left after current cost of the Allied armies occupation is paid. For the other eight years payments to America will constitute a first charge on all cash payments by Germany.

America does not share in the payments in kind or through the working of the Allied recovery acts. Washington gets paid when Germany pays cash. When Germany pays no cash, as at present, the United States gets nothing. Inasmuch as it is not probable that Germany will resume cash payments for sometime, the United States will get nothing for perhaps four years.

The agreement states that if Germany does not pay enough in the first four years so that twenty-five per cent will meet what is due America (and she will not) the deficit shall be carried over to last eight years. In case deficits occur in the last eight years, they are to bear four and one-half per cent interest until paid.

This agreement is a very favorable settlement for the United States, and the signature today shows the earnest desire of the French and British Governments to remain on good terms with the American Government. No one who has followed the negotiations has much doubt that the agreement was reached because of political reasons rather than because the Allies regarded the American contention as just.—*New York Times,* 26 May, 1923.

PROPOSED EXTENSION OF THREE-MILE LIMIT.—In the midst of the confusion over the ship liquor ruling of the United States Supreme Court and the Treasury regulations, the Harding Administration has formulated a plan which, its authors hope, may wipe out international complications and solve the problem of smuggling along American shores.

The State Department has approached the major maritime powers, including Great Britain, France and Italy, with a proposal for a reciprocal treaty arrangement whereby the three-mile limit for search and seizure of illicit goods would be extended to twelve miles, while the United States would permit foreign vessels to bring sealed sea stores of liquor into American harbors and territorial waters.

The proposal made informally to diplomats of the maritime powers is essentially a trading matter, as it demands a give and take on the part of this Government and the other Powers.—*New York Herald,* 13 June, 1923.

REVIEW OF BOOKS

FRANK BROWN, SEA APPRENTICE, Frank T. Bullen, F. R. G. S. E. P. Dutton and Company, $2.50.

A new edition of an old favorite. An accurate picture of life at sea on board sailing ships, in the days when most of the sea-carrying trade was theirs. It portrays the adventures of Frank Brown, starting as an apprentice and rising to a second mate's billet. The chapters describing the bringing in of the derelict *Wotan* are particularly clear and well done. An unfavorable picture is drawn of early American sailing ship methods. It is difficult to believe that the officers of our splendid old merchant marine were all of the type described, but this reputation was so general that there must have been some foundation for it. However, that is past now.

The book, in its information on seafaring matters is absolutely accurate, so that, as the author puts it, it "may be read without danger of acquiring false information about the sea on the ways of its servants."

A book for boys of all ages who love the sea. To them it will be fascinating indeed.

R. C. S., Jr.

THE MERCHANT MARINE, Rear Admiral William S. Benson, U. S. N. Macmillan Company, New York, 1923, $1..75.

"Constant protection can come only from an ample navy and a permanent merchant marine, under our own flag. A merchant fleet of adequate size for our peace time commerce, manned by American citizens whose loyalty will keep them at their posts when danger comes, and whose experience will equip them for higher office in our non-combatant fleet when it serves as an auxiliary to our navy, is not a mere instrument of commerce—it is a necessity. . . . Unfortunately many of our people have been quite indifferent to the situation."

With these words, included in the Introduction, Admiral Benson sounds the keynote of the volume. There follows an appeal to history, first that of seafaring countries from earliest to modern times, and second that of the United States. The latter, beginning with the first Congress and going through the nineteenth and twentieth centuries, has shown repeatedly the wish for a strong merchant marine as set forth in addresses, resolutions, and legislative bills. Thus James Madison is quoted as supporting a tonnage tax bill before Congress in 1789 with the following words:

"I admit that laying fifty cents on foreign vessels, and but six cents on our own, is a regulation by which the owners of American shipping will put a considerable part of the difference into their pockets. This, sir, I

consider as a sacrifice of interest to policy; the sacrifice is but small, but I should not contend for it, if we did not stand in need of maritime improvements. Were it not for the necessity we are under of having some naval strength, I should be an advocate for throwing wide open the doors of our commerce to all the world, and making no discrimination in favor of our own citizens. But we have maritime dangers to guard against, and we can be secured from them no other way than by having a navy (marine) and seamen of our own; these can be obtained only by giving a preference. I admit it is a tax, and a tax upon our produce; but it is a tax we must pay for the national security."

The United States has at all times supposedly had some kind of discriminating tariff, and in later years mail subventions, in favor of the American merchant marine. But these have not been enough. Our shipping companies because of national industrial conditions are not able to compete with those of the United Kingdom, and the inequality is increased by the greater cost of American ships (with which goes higher insurance), as well as by the larger wages paid the American seaman and the better fare and accomodations allowed him. American merchants have no sentiment but forward their goods by the company, foreign or domestic, offering the lowest rates. Further, England has aided her merchant marine by easy loans and subsidies. As a result, how can American ships compete with those of foreign countries unless they receive direct aid?

The argument against ship subsidies, which to the American people seem to have been rather satisfying, Admiral Benson does not take up. It seems strange to the writer of this review that Congress through successive administrations should think it necessary to protect woolen, cotton, dye, cutlery, and a hundred other industries—many of which would assuredly be driven out of America without such aid—and yet give no protection to our foreign shipping, in equal danger and second to none for national security.

Admiral Benson makes a clear case for direct Government aid to our merchant marine. As a historical investigation its value is lessened by the fact that he begins it with his mind made up and he selects his material all to bring out what he is attempting to prove—the need of Government aid. Thus it may be a question whether the work properly is included in the "Knights of Columbus Historical Series" in which it appears, but it is certainly an able brief for a ship subsidy.

The volume concludes with the story of the United States Shipping Board, very vividly related. The total number of vessels delivered by the Board from its beginning to 30 June, 1922, was 2,311, aggregating 13,627,311 deadweight tons. Such figures are eloquent; they need no comment.

C. S. A.

SECRETARY'S NOTES

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